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# USSR Report

CHEMISTRY

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CHEMISTRY

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## AEROSOLS

### DEVICES FOR CLEANING AEROSOLS FROM AIR

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 1, Jan 86, pp 29-32

[Article by L. V. Kuzmina, candidate of technical sciences]

[Excerpts] At the interindustry exhibition "Industrial Hygiene - 84," success in all areas of material industry and science in the country for devising safe procedures, technology, and means of collective and individual protection was demonstrated.

The All-Union Central Council of Professional Unions (VTsSPS), the State Committee of the Council of Ministers for Science and Technology (GKNT), the USSR State Committee of Labor (Goskomtruda), and the Exhibition of National Economic Achievements in the USSR (VKNKh) together with ministries and departments of the USSR and Union Republics conducted the exhibition under the rubric "Scientific-Technical Progress and Industrial Hygiene." Two thousand one hundred fifty exhibits were shown at the exhibition, of which 60% were full-scale originals and models. A significant number of them were actually operating.

A number of exhibits were designed for the suction and cleaning of aerosols from air:

An outfit for the suction of aerosol fluid AV36 (ENIMS) returns purified air to the work space. Some layers of special synthetic fabric of fine metallic sieves serve as the filtering material.

An apparatus for cleaning oily aerosols from air (SPKI Minselkhovmash [Ministry of Agricultural Machine-Building]) before it is given off into the atmosphere by metalworking machines using SOZh was shown. It can be used during the simultaneous emission of aerosols and dust. The apparatus' effectiveness does not depend on the decomposition of air in the flow or on the initial concentration of aerosol; for accelerating the dust's regeneration, the recovered SOZh (on which the metalworking equipment runs) is fed back into the sprayer.

A self-reacting filter for capturing the welding aerosol FSA-101 (Chernomorskoye TsPKB Minmorflot [Ministry of the Soviet Merchant Marine]) is



is designed for the suction of air from a welding zone with the subsequent cleaning of suspended particles and acidic gases. It is used during the hand-held power welding of various constructions made of ferrous and nonferrous metals and their alloys. It was introduced at the Kiliyskiy Ship Repairing Plant. Its economic effect has come to 600 rubles.

An apparatus for the suction of welding aerosols (Voronezh Association for the Production of Heavy Mechanical Presses for Minstankprom [Ministry of the Machine Industry]) is recommended for use while doing work in closed shafts, compartments, etc. The apparatus consists of a three-cycle induction motor and impellers mounted on the motor shaft's ends.

A counterflow dust trap was developed at MVTU im. N. E. Bauman for conditioning transport systems and was adopted by the Transvzryvprom [Explosive Industry Transport] Trust of USSR Ministroy [Ministry of Construction], at the Murmansk Oblast facilities. It was prepared by assembly-line at the Mintransstroy [Ministry of Transportation Construction] machine-service factory. It is recommended for cleaning aerosols from air during work on agricultural grain harvesters.

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/12955

CSO: 1841/408-P

## ADSORPTION

UDC 615.779.931:661.183.12

### KINETICS AND ADSORPTION DYNAMICS OF CYANOCOBALAMIN ON MACROPOROUS STYRENE-DIVINYLBENZENE COPOLYMER

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 20, No 2, Feb 86  
(manuscript received 5 Feb 85) pp 201-204

[Article by M. Ye. Bogdanova and N. N. Momot, Leningrad Institute of  
Pharmaceutical Chemistry]

[Abstract] In order to devise a more efficient scheme for the isolation of cyanocobalamin, studies were conducted on the kinetics and dynamics of cyanocobalamin adsorption on a novel macroporous adsorbent represented by a copolymer of styrene and divinylbenzene. Analysis of the adsorption efficiency demonstrated that the optimal conditions for the isolation of this vitamin were created by the use of a fine (75-100  $\mu\text{m}$ ) adsorbent at pH 2.5. The styrene-divinylbenzene adsorbent offered the advantage of a diffusion coefficient for cyanocobalamin of  $10^{-8} \text{ cm}^2/\text{sec}$ , as opposed to coefficients on the order of  $(0.5-1.4) \times 10^{-9} \text{ cm}^2/\text{sec}$  for conventional adsorbents SG-1 and KMT. The copolymer, therefore, appears to be a suitable replacement for SG-1 and KMT, conditions. Figures 4: references 13: 11 Russian, 2 Western.

12172/12955  
CSO: 1841/461

UDC 541.18:661.185

SYNTHESIS AND COLLOID-CHEMICAL PROPERTIES OF POLYGLYCERIN  $\alpha,\alpha$ -  
DIHYDROPERFLUOROALKANE ETHERS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85 (manuscript received 11 Dec 84) pp 578-580

[Article by L. L. Gervits, K. N. Makarov and M. Yu. Pletnev, Institute of  
Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences;  
All-Union Scientific Research and Planning Institute of Surface-Active Agents,  
Shchekbekino]

[Abstract] New surfactants, adducts of  $\alpha,\alpha$ -dihydroperfluoroalkanols and  
2,3-epoxy-1-propanol were obtained and their colloid chemical properties  
studied. The surface tension of the surfactant solutions in distilled water  
was measured. Contact wetting angles were determined. The variation of  
surface tension as a function of concentration in the solutions was used to  
find the critical concentration of micelle formation, the concentration at  
which maximum adsorption was reached and maximum adsorption at that concentra-  
tion. The compounds synthesized were found to have high surface activity  
at very low concentrations, with maximum adsorption concentration decreasing  
with increasing  $R_F$  and decreasing  $n$ . Figures 3, references 13: 6 Russian,  
7 Western.

6508/12955

CSO: 1841/377

QUANTITATIVE ELEMENTAL ANALYSIS OF MEDICO-BIOLOGICAL SAMPLES WITH USE OF LASER MASS-SPECTROMETER

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 41, No 1, Jan 86  
(manuscript received 4 Dec 84) pp 50-54

[Article by I. M. Arefyev, N. Ye. Benyayev, A. A. Komleva, G. I. Ramendik and D. A. Tyurin, All-Union Scientific Research and Testing Institute for Medical Technology; Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, USSR Academy of Sciences, Moscow]

[Abstract] Dried tissues of animal organs, whole blood and its components (serum, plasma, erythrocytes) were used to study the dependence of the value of coefficients of relative sensitivity (CRS) on the effect of laser radiation in order to develop non-standard quantitative analysis. Metered additions of element-admixtures, differing in ionization potential and specific energy of atomization, were introduced into the samples in concentrations greatly exceeding the natural level in the samples (0.01, 0.1 or 1 percent of the mass). The level of admixtures introduced was monitored by atom-absorption and neutron-activation methods. Samples were studied by a mass spectrometry method. Values of CRS are near to unity within limits of error of 20 percent at a flux density of laser radiation of  $5 \cdot 10^8$ – $1 \cdot 10^9$  W/cm. Decrease or increase of the flux density in relation to the optimum level produces discrimination: in the first case, during atomization when the CRS depend upon thermophysical parameters of the elements studied and, in the second case, during ionization, where the CRS depend upon ionization potentials of the elements. Figures 3; references 20: 18 Russian, 2 Western.

2791/12955  
CSO: 1841/454

UDC 543.4:543.8

CAPABILITIES OF INFORMATION RETRIEVAL SYSTEM FOR IDENTIFICATION OF ORGANIC IMPURITIES BY THEIR INFRARED SPECTRA

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 41, No 1, Jan 86  
(manuscript received 2 May 84) pp 156-163

[Article by I. I. Antipova-Karatayeva, Ye. A. Rykova and N. N. Kazanova,  
Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy,  
USSR Academy of Sciences, Moscow]

[Abstract] Capabilities of an information retrieval system, based on a small YES-1010 computer and used to identify organic substances by their infrared spectra is described and discussed. The system is especially efficient in detecting impurities in natural waters and in effluents. Reliability of operation of the system depends upon the quality of standard spectra in the data bank and upon the quality of experimental spectra to be identified. Infrared spectra of organic compounds can be identified on many widely used spectrometers but there are rather rigid requirements for proper recording of the position and intensity of bands. The system employs the Fortran language and may be used in institutes and laboratories equipped with only small electronic computers. Figures 3; references 14: 5 Russian, 9 Western

2791/12955

CSO: 1841/454



UDC 615.384:615.385.16]:[612.111.11:612.261]

RETENTION OF OXYGEN-CARRYING CAPACITY BY LYOPHILIZED POLYMERIC HEMOGLOBIN

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 20, No 2, Feb 86  
(manuscript received 7 Jan 85) pp 214-217

[Article by L. V. Fetisova, Ye. P. Vyazova, M. A. Azhigirova and A. A. Khachatryan, Central Scientific Research Institute of Hematology and Blood Transfusion, Moscow]

[Abstract] Studies were conducted on a variety of agents suitable for use as protectors for polymeric hemoglobin-pyridoxal-5'-phosphate (PHPP) preparations subjected to lyophilization, since the latter process generally results in a loss of 40-50% of its oxygen-carrying capacity. Attempts at prevention of methemoglobin formation and protein denaturation were conducted with glucose, sucrose, 40,000 MW Ficoll, Tris, and 4,000 MW polyethylene glycol. The results showed that virtually complete retention of the oxygen-carrying capacity can be assured by the use of either glucose or sucrose: in the presence of either agent PHPP can be stored at 4°C for at least 10 days with only a 1.5-2.0% increase in the methemoglobin concentration. Concomitantly, the decrease in the oxygen capacity remains insignificant, falling to  $1.27 \pm 0.03$  vol% oxygen/g hemoglobin. Figures 1; references 11: 1 Czech, 4 Russian, 6 Western.

12172/12955  
CSO: 1841/461

## CATALYSIS

UDC 547.412.733:542.944.6

### DEHYDROCHLORINATION OF CHLOROETHANES UPON INTERPHASE CATALYSIS WITH POLY-GLYCOLS, QUATERNARY AMMONIUM SALTS AND CROWN ETHERS

Moscow ZHURNAL VSESOUYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85 (manuscript received 18 Dec 84) pp 580-581

[Article by F. S. Sirovskiy, Yu. A. Trager, M. V. Panova and A. V. Voronkina,  
State Scientific Research and Planning Institute of the Chlorine Industry]

[Abstract] The purpose of this work was quantitative comparison of the activity of a number of onium and non-onium catalysts in dehydrochlorination of 1,1,2-tri- and 1,1,2-tetrachloroethanes. Quaternary ammonium salts were found to be more active than pentaethylene glycol in dehydrochlorination, while pentaethylene glycol is more active than the crown ethers. The kinetics of dehydrochlorination of 1,1,2-trichloroethane with pentaethylene glycol catalysis are similar to those described for dehydrochlorination of 1,1,2,2,3-pentachloropropane catalyzed by triethylbenzyl ammonium chloride. The reaction is a first order reaction with respect to the catalyst, and its speed decreases greatly after 50-60 percent conversion. The reaction occurs in the kinetic area, the initial speed depending on the rate of agitation and initial NaOH concentration. The results indicate common systems of interphase catalysis by quaternary ammonium salts and polyethylene glycols in alkaline dehydrochlorination. Figures 2; references 8: 5 Russian, 3 Western.

6508/12955

CSO: 1841/377

## PHOTOCATALYTIC TRANSFORMATION OF ETHANOL INITIATED BY PHOTOTRANSFER OF ELECTRONS IN TITANIUM ALKOXY-CHLORIDE COMPLEXES

Kiev TEORETICHESKAYA I EKSPERIMENTALNAYA KHIMIYA in Russian Vol 22, No 1, Jan-Feb 86 (manuscript received 27 Dec 84) pp 44-51

[Article by A. I. Kryukov, S. Ya. Kuchmiy, A. V. Korzhak and A. N. Korol, Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Since labile titanium complexes have been shown to function as photocatalysts, further studies were conducted on the behavior of  $TiCl_4$  in ethanol exposed to 254 and  $>320$  nm light. Illumination with  $>320$  nm light initiates photochemical reduction of  $Ti(IV)$  to  $Ti(III)$ , with  $Ti(III)$  accumulation occurring in a linear fashion. Analysis of the kinetics of  $Ti(III)$  formation on illumination with 254 nm light shows an initial maximal rate followed by a gradual slowdown. This is due to an increase in internal light filtration as  $Ti(IV)$  is transformed into  $Ti(III)$  and, more importantly, photooxidation of  $Ti(III)$  into  $Ti(IV)$  by 254 nm light due to phototransfer of electrons from the central ion to the ligand. The latter reaction is responsible for hydrogen production in alcoholic  $TiCl_4$  solutions. Irradiation of such solutions leads to the appearance, in addition to hydrogen, of products representing oxidation and destruction of ethanol: methane, acetaldehyde, ethane and ethyl chloride. Ethane is, in addition, produced along with molecular hydrogen in the course of oxidation of  $Ti(III)$ . In studies with  $>320$  nm light, which is not absorbed by  $Ti(III)$  complexes, no hydrogen is formed while formation of the organic compounds ceases after photooxidation of  $Ti(IV)$  is completed. Figures 3; references 9 (Russian).

12172/12955

CSO: 1841/477

EFFECTS OF WATER ADDITION ON PATHWAYS AND EFFICIENCY OF PHOTOCATALYTIC REACTIONS OF ETHANOLIC SOLUTIONS OF  $\text{TiCl}_4$ 

Kiev TEORETICHESKAYA I EKSPERIMENTALNAYA KHIMIYA in Russian Vol 22, No 1, Jan-Feb 86 (manuscript received 27 Dec 84) pp 51-58

[Article by A. I. Kryukov, S. Ya. Kuchmiy, A. V. Korzhak and A. N. Korol, Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] The behavior of  $\text{TiCl}_4$  as a photocatalyst in ethanolic solutions was assessed in relation to the addition of various quantities of water to determine the effects of the latter on the reaction mechanisms. Using a combination of electron spectroscopy, ESR, and gas-liquid chromatography resulted in the demonstration that illumination of a  $\text{TiCl}_4$  solution prepared in absolute ethanol with 254 nm light involved Ti(IV) and Ti(III) coordination compounds in the oxidation and decomposition of ethanol to acetaldehyde, methane, ethane, ethyl chloride and molecular hydrogen. In the presence of 0.5 moles/liter  $\text{H}_2\text{O}$ , or less, formation of methane and ethane fell sharply and that of hydrogen increased vis-a-vis the situation in absolute ethanol. The effects of water were ascribed to transformation of the mixture of Ti(IV) chloride-alkoxy complexes and their associated complexes ( $\text{Ti}(\text{OC}_2\text{H}_5)\text{Cl}_3$ ,  $\text{Ti}(\text{OC}_2\text{H}_5)\text{Cl}_2$ ) into hydroxy complexes which, on further increase in the water concentration, were transformed into bridge compounds with  $[\text{Ti}(\text{IV})-\text{O}-\text{Ti}(\text{VI})]$  fragments. The net effect is the formation of  $\text{CH}_3\text{CHOH}$  primary radicals, rather than  $\text{C}_2\text{H}_5$  formed in absolute ethanol, leading to diminished formation of methane and ethane and an increase in acetaldehyde production. Figures 3; references 13: 10 Russian, 3 Western.

12172/12955

CSO: 1841/477

CHEMICAL INDUSTRY

JOINT SCIENTIFIC-TECHNICAL WORK OF "MONOKRISTALLREAKTIV" SCIENTIFIC-PRODUCTION ASSOCIATION AND RUBEZHNOYE "KRASITEL" PRODUCTION ASSOCIATION IN AREA OF ORGANIC LUMINESCENT MATERIALS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85, pp 570-572

[Article by V. I. Grebenyuk, Candidate of Technical Sciences, S. Ye. Kovalev, deceased, V. I. Kholodyazhnyy, Professor B. M. Krasovitskiy and T. A. Serdechnaya]

[Abstract] The two organizations noted in the title have cooperated since 1964 on research and production of luminophors. This article notes some examples of the results of their cooperation, including the creation of luminescent dyes for polystyrene and polymethyl methacrylate, yielding blue, yellow, yellow-green, orange and orange-red luminophors; the production of day-glow fluorescent pigments, solid solutions of luminophors in easily dispersed polycondensation polymers; luminescent dyes for polyethylene; and magnetic-luminescent powders for defectoscopy of ferromagnetic materials. References 20 (Russian).

6508/12955  
CSO: 1841/377



UDC 66.012-52:668.8.112.1

DEVELOPMENT AND INTRODUCTION OF FLEXIBLE AUTOMATIC INSTALLATIONS FOR CONTINUOUS PRODUCTION OF AZODYES

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86 pp 50-54

[Article by V. I. Bodrov, S. I. Dvoretzkiy, V. F. Kalinin, B. A. Baranov and N. P. Utrobin]

[Abstract] Results were reported of the design studies for an automated experimental industrial unit for continuous production of azodyes and its operational characteristics during long-term operations. Production of azodyes consists of a number of discrete steps: preparation of starting materials, diazotization, azocoupling, filtration, drying and disperison of the dry dye. The most expensive step includes the synthesis of the dye, determining economic feasibility of the process and the quality of dye. Mathematical models were developed for evaluating the color and physicochemical properties of pigments in relationship to the crystal dimensions of the pigments. Diminished size of the pigment crystals optimizes their dyeing ability, saturation of the basic tones, the transparency and fine shading of the dyes. No pigment can be produced with all optimal indices, as some of them depend on larger and some on smaller crystals. A compromise must be reached depending on specific application. An automated unit for continuous production of azodyes was developed capable of regulating the pigment composition to yield desired end points. It includes two sub-systems: "optimizer" and "corrector". Performance of this unit was tested with satisfying results under actual production conditions. Figures 5; references 10: 9 Russian, 1 Western.

7813/12955

CSO: 1841/474

UDC 678.5.061.62"71"

COMPLEX PLANNING OF MEASURES DESIGNED FOR TARGETED DEVELOPMENT OF SCIENTIFIC RESEARCH INSTITUTES

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 3-5

[Article by V. P. Tyulmankov, V. V. Guzeyev, Ye. P. Varlamov and V. A. Romanov]

[Abstract] A successful program of any scientific research institute depends on the quality of planning at least for a ten-year period. A planning methodology was developed at the Scientific Research Institute of Polymers imeni V. A. Kargin. It is a seven-step process: 1) selection of developers and experts; 2) development of a "goal tree"; 3) evaluation of goal priorities; 4) preparation of the plan; 5) execution; 6) evaluation of the achievements and 7) plan adjustments. Obviously the goal tree was considered the most important principle in this planning schematics and it was analyzed in detail in relationship to other planning aspects. This planning method was introduced in 1982-1983; two years later, positive results were already noted: coefficient of economic effectiveness (not defined) increased by 31% and the economic effect of new developments per rubel of investment by 38%. The goal tree is a flexible instrument which should be reviewed by the head of the organization and adjusted as necessary, especially if some factors were missed in the original conceptualization. References 11 (Russian).

7813/12955

CSO: 1641/465

UDC 666.001

STATE OF AND MEASURES AIMED AT ACCELERATED RECYCLING OF PRINCIPAL INDUSTRIAL FUNDS IN CHEMICAL AND PETROCHEMICAL INDUSTRY OF UKRAINIAN SSR

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 1, Jan-Feb 86  
(manuscript received 11 Sep 85) pp 3-6

[Article by V. V. Kalechits and N. N. Yakubovskiy, UkSSR State Plan, Kiev]

[Abstract] An analysis was presented of the flow of funds for four of the past five-year plans. Chemical industry invested a lower percentage of new monies currently than it did 15-20 years ago. The last five-year period witnessed a drastic increase of funds committed to replacement of aging inventory. Overall budget growth appears to slow down. An appeal was made to intensify modernization of technical equipment, refurbishing of old plants, upgrading of facilities. The effectiveness of capital investment is the highest at plants investing in reconstruction and refitting, much higher than in those expanding operations or attempting new ventures. One of the more important principles of modernization is that the entire plant, not just individual components, should be the target of such a program. A suggestion was made that too much of a centralized administration has a detrimental effect on solving problems involving multiple administrative echelons or parallel organizations. A number of generalized suggestions were made of how to improve the evidently deteriorating situation.

7813/12955  
CSO: 1841/456

## COAL GASIFICATION

### PAMPHLET ON COAL AND NATURAL GAS AS SOURCES FOR PRODUCING SYNTHETIC LIQUID FUEL AND CHEMICAL PRODUCTS

Moscow UGOL I PRIRODNYI GAZ - ISTOCHNIKI DLYA POLUCHENIYA ISKUSSTVENNOGO ZHIDKOGO TOPLIVA I KHIMICHESKIKH PRODUKTOV (NOVOYE V ZPIZNI, NAUKE, TEKNIKE: SERIYA KHIMIYA) in Russian No 2, Feb 86 (signed to press 3 Feb 86) pp 2, 48

[Annotation and table of contents of pamphlet "Coal and Natural Gas - Sources for Producing Synthetic Liquid Fuel and Chemical Products," by Albert Lvovich Lapidus, doctor of chemical sciences and professor and chief of the laboratory of the Organic Chemistry Institute imeni N.D. Zelinskiy of the USSR Academy of Sciences, and Anna Yuryevna Krylova, candidate of chemical sciences and senior scientific associate of the State Research and Planning Institute of the Chlorine Industry, Izdatelstvo "Znaniye", 27,500 copies, 48 pages]

#### [Text] ANNOTATION

This pamphlet examines the basic characteristics of solid and gaseous fuel resources and the basic ways to use coal and natural gas to obtain synthetic liquid fuel and raw materials based on them for the chemical industry. Considerable attention is paid to problems of production of chemical compounds from coal gasification products and the development of syntheses based on molecules containing one carbon atom.

The pamphlet is intended for professors, instructors, and students at peoples universities.

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12410

CSO: 1841/470

## CATALYST FOR PRODUCTION OF GASOLINE FROM LIGNITE

Yerevan KOMMUNIST in Russian 3 Nov 85 p 3

[Article by Yu. Khots, Krasnoyarsk: "Catalyst from Waste Products"]

[Text] Scientists of the Chemistry and Chemical Technology Institute of the Siberian Department of the USSR Academy of Sciences have obtained gasoline from lignite by using waste products from nonferrous metallurgical enterprises.

Scientists have known the formula for converting solid fuel into liquid for a long time: it is necessary to treat coal with hydrogen. However, high-quality gasoline can be obtained successfully only at high pressure and at high temperatures. And most of all, a catalyst is necessary to accelerate the process.

"According to existing technology, iron-molybdenum compounds are used in this capacity," says Doctor of Chemical Sciences B. Kuznetsov, deputy director of the institute. "But in spite of its effectiveness, such a method has an important disadvantage--molybdenum is rather expensive. This factor becomes determinant for large scale production. Therefore, scientists were also called upon to search for a new, economical catalyst. For these purposes, they decided to use waste products of nonferrous metallurgical enterprises--slime. The researchers conducted dozens of experiments with different forms of slime before instruments showed that coal began to absorb hydrogen actively. Thus, a new composition was found which is capable of accelerating the conversion of coal into liquid fuel. The results of the studies of the Siberian scientists have also been confirmed at the facility of the High Temperature Institute of the USSR Academy of Sciences."

The chief merit of the proposed technology is its great economy--the cost of the catalyst is determined only by the price of its transport from dumps to the place of production.

12410

CSO: 1841/470



DERIVATOGRAPHIC AND CHROMATOGRAPHIC STUDY OF PYROLYSIS OF IRRADIATED BROWN COAL

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 2, Mar-Apr 85  
pp 30-33

[Article by N. I. Mustafayev, N. A. Eyubova and M. M. Melikzade, Radiation Research Sector, AzSSR Academy of Sciences]

[Abstract] A study was made of thermal decomposition of irradiated coal by derivatographic and chromatographic analysis with identification of the gas products of pyrolysis, thermal effects and changes in the weight of the coal. Coal specimens were dried at 110°C for 4 hours and evacuated in a molybdenum glass ampule to  $10^{-2}$  mmHg, then irradiated at 25°C in a K-25 installation with an absorbed dose power of 19 kGr/hr. The beginning of effective decomposition of the coal is shifted by 40-60°C into the low temperature range for coal irradiated at 40-800 kGr, apparently a result of the destructive influence of the gamma radiation. Irradiation at 300°C with a dose of 100 kGr results in liberation of gasses at  $9.5 \cdot 10^{11}$  molecules/g·sec. Decomposition of these specimens does not occur at up to 250°C during pyrolysis. This indicates that the nonthermally stable portion of the coal is volatilized during irradiation. The rate of weight loss is altered, up to 50%, by irradiation and the endothermic effect of 170°C is reduced, while the composition of the gaseous products of pyrolysis is altered. Above 250 kGr of gamma radiation results in polycondensation of the coal mass. References 8: Russian.

6508/12955

CSO: 1841/365

GAS FORMATION DURING RADIATION-CHEMICAL REACTIONS OF COAL

Moscow KHIMIYA VYSOKIKH ENERGIY in Russian Vol 19, No 6, Nov-Dec 85  
(manuscript received 25 Oct 84) pp 557-558

[Article by I. I. Mustafayev, M. Ya. Bakirov and Kh. M. Gadzhiyev, Section of  
Radiation Studies, AzSSR Academy of Sciences]

[Abstract] Experimental results were reported of radiation-chemical reactions of coal in a coal + H<sub>2</sub>O system. The temperature maintained during vacuum pretreatment of coal (20-400°C) influences the composition of the gasses formed: H<sub>2</sub>, CO and CH<sub>4</sub>, reaching maximum yields at 130-150°C. Radiation did not influence formation of these gasses to any significant degree. Only at the highest doses (181.8 kGr/hr) there was an increased formation of H<sub>2</sub>, probably on account of local heating of the coal. Temperature, however, had a significant effect on H<sub>2</sub> formation: a temperature rise from 20 to 500°C increased the H<sub>2</sub> yield from  $5 \cdot 10^{-3}$  to 1.56. Formation of these gasses from purified coal (removal of moisture and occlusion gasses) is the result of the breakdown of its organic components. CO was formed only at temperatures above 250°C. Figure 1; references 5 (Russian).

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CSO: 1841/254

UDC 665.731:753.001.41

FLAMMABILITY OF DIESEL FUELS OF VARIOUS COMPOSITION

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 2, Feb 86 pp 27-29

[Article by A. A. Gureyev, G. M. Kamfer and G. B. Prigulskiy, Moscow  
Institute of Petrochemical and Gas Industry imeni I. M. Gubkin]

[Abstract] Laboratory evaluation of a number of fuels was carried out in respect to their flammability on a special design cylindrical combustion chamber equipped with measuring instruments. Experimental results showed that temperature elevation during injection of fuels led to a decrease in the period of inflammation delay which was inversely related to the increase in cetane number of the fuel tested; physical delay period and change in the pressure were not affected by it. However, this relationship was only qualitative. Fuel flammability of various Diesel fuels should be evaluated on the basis of the calculated inflammation delay period. Figures 3; references 3, Russian.

7813/12955

CSO: 1841/473

ELECTROCHEMICAL ISOLATION OF METALS FROM MELTS ON SOLID BIPOLAR ELECTRODES

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 1, Jan 86 (manuscript received 22 Jul 85) pp 48-50

[Article by A. A. Omelchuk, V. G. Budnik and O. G. Zarubitskiy, corresponding member, Ukrainian SSR Academy of Sciences, Institute of General and Inorganic Chemistry, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A cursory mathematical analysis is presented of the electrical circuitry used in the isolation of metals from melts on solid bipolar electrodes, demonstrating that, in theory, metal recovery in such electrolysis cells should always exceed that in conventional cells with monopolar electrodes. The actual yield depends on  $R_2/R_1$ , representing the resistance in the two circuits. Confirmation for the theoretical analysis was provided by actual recovery studies on lead from chloride melts, in which the theoretical recovery figures came within 3-4% of the experimental yields. The difference was attributed to factors involved in the accuracy of determination of  $R_1$  and  $R_2$  values from volt-ampere plots. Figures 2; references 2: 1 Russian, 1 Western.

12172/12955  
CSO: 1841/453

## ELECTROCHEMICAL PROPERTIES OF CONDUCTIVE POLYPYRROLE COATINGS IN AQUEOUS MEDIA

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 20 Mar 84) pp 3-8

[Article by A. A. Yakovleva, V. V. Krasko and Ya. M. Kolotyrkin, Scientific Research Physicochemical Institute imeni L. Ya. Karpov, Moscow]

[Abstract] Quasi-unidimensional systems that can be donors or acceptors become useful conductors. The present article reports on study of principles of formation and electrochemical behavior of polypyrrole films in aqueous media to determine their use as electrodes. Solutions of pyrrole based on  $H_2SO_4$ ,  $Na_2SO_4$  and  $NaClO_4$  were recrystallized and distilled to produce the initial material. Chemical composition and film structure were studied by infrared spectroscopy, electron microscopy and electronography. The dense black film produced had crystalline structure with covalent anions bonded to the matrix structure, in a more complex overall structure than previously supposed. Analysis of impedance showed differing reactions and structures for platinum with and without the test coating. The reaction within the coating was limited by diffusion of hydrogen anions and ions. Thus the study indicated that conductive polymer films synthesized from aqueous media are stable and durable and can serve effectively as electrodes for oxidation and reduction reactions, but their usable range is limited by relatively low electrical potential of irreversible oxidation. Further study of other parameters is needed. Figures 7; references 11: 1 Russian, 10 Western.

12131/12955  
CSO: 1841/427



UDC 541.138

ELECTROCHROMIUM SYSTEM BASED ON METHYLVILOGEN. EFFECT OF POLYMER, ELECTROLYTE PRESENT AND SOLVENT TYPE ON BASIC CHARACTERISTICS

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 7 Feb 84) pp 58-62

[Article by Yu. F. Pugachev, and I. V. Neverov, Ul'yanovsk Polytechnic Institute]

[Abstract] The need for polymer thickeners in electrochromium systems (ECS) has been frequently demonstrated; it brings even clearness to the substance. The present article reports on study of methylviologen borfluoride (MVBF) in a redox system on gamma-butyrolactone (GBL) and (ACN) solvents. Procedures for producing the test substances are summarized. Optical density and the dependence on temperature for return to the original state show the influence of the basic electrolyte, the solvent type, and the percent content of polymethylmethacrylate (PMMA) in the composition. With DMF (dimethylformamide) on the electrode, the charge accumulation was slower than with GBL. The time required for removal of coloration without the basic electrolyte changed in a narrow range with varying amounts of PMMA concentration, but addition of tetrabutylammonium borofluoride reduced the time required and concentrations below 5% PMMA, and increased it with 10% PMMA. Further details of the reactions are also summarized. Figures 2; references 15: 14 Russian, 1 Western.

12131/12955  
CSO: 1841/427

UDC 621.315.592:546.28

KINETICS AND MECHANISM OF ELECTROCHEMICAL FORMATION OF POROUS SURFACE LAYER  
ON SILICON IN HYDROFLUORIC ACID. KINETIC FEATURES OF POROUS LAYER GROWTH  
AND ANODE DISSOLUTION OF n-TYPE SILICON IN GALVANOSTATIC POLARIZATION PROCESS

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 4 Nov 83) pp 16-23

[Article by S. O. Izidinov, A. P. Blokhina and T. S. Martynova, All-Union  
Electrotechnical Institute imeni V. I. Lenin, Moscow]

[Abstract] The authors report on study of principles of kinetics of the formation of porous silicon layers (PSL) and anode dissolution and their dependence on electrode characteristics of n-type silicon. Infrared spectroscopy was used to determine the composition of surface oxidation products. Pore formation was found to be a result of local dissolution of silicon, in a peculiar pitting process. The dissolution process occurred at a constant rate throughout the tested process. The mechanism of PSL formation and reasons for its retardation contribute to understanding of principles of pore structure changes and PSL topology. Electron-microscope pictures showed the diameter of pores to be 1-3  $\mu\text{m}$ . Due to its low solubility, silicic acid partially precipitated on pore walls. In the final stage of reaction, electrode potential increased in the area of pore-canal apertures due to localization of their flow, and oxidation of bivalent silicon to quadrivalent forms occurred. Pore apertures grew in size and large loci of electrolytic polishing and corrosion figures appeared. Figures 6; references 20: 10 Russian, 10 Western.

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PHOTOELECTROCHEMICAL BEHAVIOR OF HETEROSTRUCTURE OF TUNGSTEN TRIOXIDE-TITANIUM DIOXIDE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 12 Mar 84) pp 83-89

[Article by D. V. Sviridov and A. I. Kulak, Byelorussian State University  
imeni V. I. Lenin, Minsk]

[Abstract] Combination of two or more semiconductive materials "forbidden zone" widths permit broader spectral sensitivity and better photocorrosion durability in use. The present article reports on study of the heterostructure of tungsten trioxide-titanium dioxide systems, which have similar chemical structure and similar  $E_g$  zones. A film of  $TiO_2$  was deposited from polybutyl-titanate on  $WO_3$  layers in tert-butanol then dried in air at  $450^\circ C$ . Spectral sensitivity tests were conducted after dyeing. To determine the role of the  $TiO_2$  layer in sensitization of a  $WO_3$ - $TiO_2$  electrode, or whether it serves as a dielectric layer, a variant system with  $SiO_2$  was compared for behavior. Results indicated that the  $TiO_2$  was 5-6 times more effective in retaining the dye. The test system also had a greater cathode function in the sensitivity range. It was also superior in generating electron-vacancy couples (initiated in  $WO_3$ ) that participated in photoelectrochemical processes with the couples from  $TiO_2$ , surpassing both of these semiconductors alone and the  $WO_3$ - $SiO_2$  system that was also tested. Figures 4; references 27: 17 Russian, 10 Western.

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## EFFECT OF GRAVITATIONAL FIELD ON DIFFUSION KINETICS IN CELL WITH CYLINDRICAL ELECTRODE

Moscow ELEKTROKIMIYA in Russian Vol 22, No 1, Jan 86  
(manuscript received 23 Mar 84) pp 107-113

[Article by A. P. Grigin, V. A. Petrov and N. V. Petkin, Moscow]

[Abstract] The authors report on experimental and theoretical study of natural convective diffusion in an electrochemical cell formed by cylinders with varying radii, a platinum electrode, and controlled current from triiodide ions to the cathode. The density of the solution in the solution was determined on the basis of all ions present, and is expressed in the calculations as the concentration of triiodides. At low Rayleigh numbers, the gravitational field did not change the integral diffusion current, but only brought local redistribution on the electrode surface. Calculations are shown to present the hydrodynamic task, the flow of convective diffusion, and the results of integration over the entire cylinder surface. Results showed that the diffusion currents were equally developed in two halves of the cell, and an isolating membrane was required in order to obtain a variation in current. Experimental verification indicated that divergences between theory and experiment could be explained by "eccentricities" in a given cylindrical cell; the variations did not exceed 5%. Figures 3; references 7.

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UDC 537.311.31

SYNTHESIS AND CHARACTERISTICS OF TETRACYANOQUINODIMETHANE-QUATERNARY AMINE  
CHARGE TRANSFER COMPLEXES

Kiev TEORETICHESKAYA I EKSPERIMENTALNAYA KHIMIYA in Russian Vol 22, No 1,  
Jan-Feb 86 (manuscript received 17 Aug 84) pp 102-105

[Article by V. A. Bondarenko, E. Lazar, K. I. Pokhodnya and M. A. Tanatar,  
Institute of Semiconductors, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] An analysis was conducted on the electrical and optical characteristics of charge transfer complexes prepared from donor quaternary amine salts and acceptor tetracyanoquinodimethane (TCNQ). Four complexes were prepared, starting with the synthesis of the quaternary salts by the reaction of the respective amines and hydrogen iodide, followed by reaction of the quaternary salts with TCNQ. UV and IR spectroscopies of the  $M^+(TCNQ)_n^-$  charge-transfer salts demonstrated semiconductive properties dependent on conductivity of the TCNQ stacks. The specific resistance for three of the complexes was reported to be in the  $>10^{10} \text{ ohm}\cdot\text{cm}^{-1}$  range at room temperature, and the conductivity for another at ca.  $10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$  with an energy of activation of 0.15-0.17 eV in the 100 to 300 K range. Figures 4; references 11: 2 Russian, 9 Western.

12172/12955

CSO: 1841/477



UDC 661.723.63.13

STATISTICAL METHODS OF ANALYSIS OF EXPLOSION DANGER OF CHEMICAL PRODUCTION PROCESSES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85 (manuscript received 24 Jan 85) pp 588-589

[Article by A. G. Nikitin and M. I. Strizhevskiy, Moscow Construction Engineering Institute imeni V. V. Kuybyshev]

[Abstract] All-Union State Standard GOST 12.1.010-76 calls for considering construction processes where the probability of development of an explosion during the course of one year is greater than one in a million as explosion-dangerous processes. The question arises as to how the probability, a random function of a number of factors which are difficult or impossible to calculate, can be computed. The answer is a statistical (probability theory) approach based on materials on the gas content of production spaces, data on emergency situations developing over several decades at chemical plants and the results of many measurements and analyses performed in the laboratory. Computer processing of statistical data has indicated that in a number of processes considered explosion-dangerous, the probability of development of concentrations exceeding the minimum explosive concentration is less than  $10^{-6}$  per year. References 3 (Russian)

6508/12955

CSO: 1841/377

## FERTILIZERS

### PARTY APPARATUS OF MINERAL FERTILIZER MINISTRY

Moscow PARTIYNAYA ZHIZN in Russian No 22-23 Nov-Dec 85 pp 123-126

[Article by A. Diyenko: "To Improve the Work of the Ministry Apparatus"; report of meeting, date and place not given]

[Text] One of the most important factors in the intensification of agricultural production is its comprehensive chemization. The Food Program specifies that half of the planned increase in agricultural production is to be obtained because of the use of mineral fertilizers. In connection with this, the task was set before the sector for the production of mineral fertilizers--to increase their production in the present Five-Year Plan in comparison with the last by a factor of 1.5, and by 1990, by a factor of almost 2. Such growth rates require a qualitatively new approach to the problems of the organization of production and its management at all levels. Demands are growing especially for workers of the ministry apparatus and All-Union industrial associations responsible for assuring efficient work of sector enterprises and fuller use of available resources.

It is noted in the plan of the new edition of the CPSU Program that the attention of the central management agencies to a high degree should all be concentrated on the solution of strategic tasks of economic and social development and on practical achievement of a unified policy in the field of scientific and technical progress and capital investments.

Namely, the discussion at the review-election meeting of the party organization of the apparatus of the Ministry for Production of Mineral Fertilizers also proceeded in the light of the high requirements set by the party, a report on which was presented by V. Chelnokov, secretary of the Party Committee.

And he and speakers in the debates stressed that for the years of the Five-Year Plan the production of mineral fertilizers rose by 40 percent, labor productivity, by 28 percent, and profit, by 58 percent. It is important that the increase in production volume was achieved basically because of the rise in labor productivity.

Much has been done. However, the meeting participants focused their attention basically on the deficiencies existing in the work of the ministry apparatus. It was noted that in the first nine months of the current year, the sector did

not come up to the planned level of production growth and did not provide an output of the full volume of mineral fertilizers, primarily potash, and also ammonia and sulfuric acid. Only 92.4 percent of the commitments for deliveries was met.

The reason for these and other miscalculations and omissions, it was stated in the report and in the speeches of V. Menshov, chief of the science and engineering administration, Yu. Mavlyaviyev, chief of the department of administration of project planning and capital construction, O. Romanov, chief of the Soyuzkaliy [Potash Union] All-Union Industrial Association, and others, lies in the insufficient effectiveness of control of the party organization for the work of the apparatus.

It was noted at the meeting that the members of the collegium of the ministry and the Party Committee clearly lack firmness and continuity in pursuing a policy for absolute fulfillment of plans and socialist commitments by the sector and party strictness for those who work, so to speak, in a slipshod manner and do not show initiative and persistence in their work.

The Party Committee insufficiently affected an improvement in the work style of the apparatus, did not launch vigorous efforts for strengthening state discipline, was not always decisive in combatting bureaucratism and red tape, and occasionally showed sluggishness in eliminating negligence in existing subdivisions of the ministry. It also weakly raised the role of shop party organizations in strengthening discipline and self-discipline for different sections, and in the improvement of the ideological, work and moral education of the people.

It cannot be said that the Party Committee did not influence the improvement of the state of the matter at all. The speaker told about those measures which the party organization has initiated for the improvement of the work of all sections of the ministry apparatus and for raising the responsibility of associates for the work assigned. The Party Committee has widely used the practice of reports of party members, and most of all of Communist leaders at their meetings and at party Buro and shop party meetings. Discussions were conducted in the party organization with many Communists on the discovery and use of resources.

And nevertheless, the headquarters Party Committee of the sector was not as successful as it should be in arranging clear-cut and amicable work of the apparatus, in directing the energy of its workers toward the improvement of the activity within the jurisdiction of enterprises and organizations.

As it was noted in the report and in the speeches of V. Krokhin, chief power engineer of the ministry, B. Plotnikov, manager of the Fertilizer Organization Trust of the ministry, and others, the Party Committee was not able to solve the main task--the mobilization of the forces of the apparatus associates for gaining efficient control of activity and for skillful operation under new conditions. At the meeting, a serious reckoning was presented to those Communists who continue to live by old standards and be content with little. The unsatisfactory work of leaders of one of the leading subdivisions of the ministry--the Soyuzazot [Nitrogen Union] All-Union Industrial Association--was subjected to sharp criticism in particular. The turn to the new was not done by everyone

without reserve, and most of all by the former leader of the association, N. Melentyev. By putting trust in old services, he recently ceased to show initiative and persistence in work and was resigned to deficiencies. As the result of low requirements for leaders and specialists of services both within the association and for the directors within the jurisdiction of enterprises, a placid situation was created, and self-critical evaluation was not done. This, in its turn, without delay affected the activity of the whole nitrogen subbranch, which began to lose the positions gained previously. In the first nine months of the current year, the Soyuzazot enterprises did not fulfill the plan for all the technical-economic indicators.

And what about the Party Committee? What was its role in reaching a turning point in the work of this subsector which is important for the ministry? The unsatisfactory situation which arose there disturbed it. Most of all, the Party Committee in the period under review examined problems six times which were related to the work of the association, accepted the decrees of Communist leaders making commitments, and required "supply", "pay attention", "anticipate", and "shape up". And only when the national economic plan for all sectors appeared to be under threat of failure, did the Party Committee, confirming the decision of the party organization of the association, announce the severe party penalty to the leader of Soyuzazot, N. Melentyev, and placed before the members of the collegium of the ministry the problem of dismissing him from his post.

It was noted at the meeting that the measures taken by the Party Committee and the leadership still have not produced a substantial result. The situation of the subsector with respect to the production of ammonia is being corrected extremely slowly. The party organization of the industrial organization, having determined the tasks of Communists for overcoming lagging, weakly uses the right given to it to control the work of the apparatus, and timidly approaches the evaluation of the activity of Communist leaders.

Speaking of the necessity for urgent and consistent conduct of the course for reorientation of managerial personnel in the spirit of new approaches and requirements advanced by the April and October, 1985 Plenums of the CPSU Central Committee, the meeting participants noted that the party organizations are far from having done everything here. In the ministry apparatus, as before, there were cases of a negligent relationship to business, of impracticability, and of formalism.

Serious deficiencies are permitted in matters of the selection and placing of personnel. It was noted, for example, that in subdivisions of the apparatus of the ministry and associations, workers were hired who did not have work experience in industry. Thus, in the period under review, the Soyuzkaliy [Potash Union] Association hired 12 specialists, 7 of whom had never worked a day at the enterprises or in organizations of the sector. There also are similar examples in other subsectors. The meeting participants expressed serious criticism in the address of Deputy Minister S. Dorokhin, and Chief of Management of Personnel and Educational Institutions M. Zolotov concerning errors in the work of recruiting personnel of the apparatus of the ministry, industrial associations, and enterprises of the sector, especially those rehired, and demanded immediate elimination of the deficiencies.



The success of a business, the meeting participants stressed, is determined in the labor collectives--in production associations, in enterprises, in shops and brigades, and at workplaces. To work conscientiously, to observe discipline strictly, to show responsibility and initiative, to care about government interests as about one's own--this essentially is required today from everyone whatever his post or occupation. Such a posing of the problem by Communists is explained by the fact that now it is too little for workers of the management apparatus to be simple executives, and it is important to aim for the best organization of their work and a high performance from production collectives.

Great anxiety was expressed at the meeting in connection with the fact that at a number of the sector enterprises, tolerance toward infringers of discipline is appearing. This year, losses from absenteeism, tardiness, and nonappearance with permission of the administration did not comprise 1,000 man-days. In the campaign for strengthening order at each division of production, technological discipline occupies a no less important place. Its disturbances lead to appreciable damage. It was stated at the meeting that members of the collegium of the ministry and deputies of the ministry up to now have made an extremely modest individual contribution so that modern expensive complexes of huge capacity for production of mineral fertilizers are charged with great efficiency. The Party Committee accepted business-like decrees on these problems with a directive of specified times and executives. But the absence of solid demand, especially with leaders of the upper echelon of management, did not contribute to an improvement of the matter. Therefore, the measures undertaken by the Party Committee appeared to be ineffective.

The meeting participants paid special attention to problems of very rapid catching up of the lagging units. Among these, the speakers said, are the management of project planning and capital construction in the ministry together with others. The Communists of this subsector in the period under review were not successful in obtaining a radical improvement of the matter. In nine months there was a shortage of 220 million rubles of capital investments, including 103 million rubles for construction and installation work. Of 30 industrial plants, 20 did not go on stream. In the ministry and in associations, it was stated at the meeting, the possibilities of an economical method of construction have been underestimated.

A very short time separates workers of the sector from work in the new year. Therefore, all Communists, it was noted at the meeting, must show very clearly that only fulfilling the plan of the fourth quarter enables the sector to reach the level necessary for implementing the 1986 plan.

The 12th Five-Year Plan has a number of features for the Ministry of Mineral Fertilizer Production sector. The first of them--it is necessary to increase considerably the efficiency of the use of production capacities, and the second, a rise in production volumes must be achieved without increasing the work force.

The large scale and the complexity of the tasks which are posed before the sector for the present Five-Year Plan, said Minister A. Petrishchev at the meeting, do not give us the right to complacency. Agriculture of the USSR has to be



supplied 30-32 million tons of mineral fertilizers in 1990, as stipulated in the plan of the Basic Directions of Economic and Social Development of the USSR. Socialist competition is developing widely at the enterprises of the sector as a pledge of the successful achievement noted. Having maintained the initiative of the AvtoVAZ collective for the acceleration of scientific and technical progress by raising the efficiency of production and the quality of output, the leaders of the sector--the Voskresensk Minudobreniya [Mineral Fertilizers], the Severodon-yetsk Azot [Nitrogen], and a number of other production associations--also decided to attain new high work results.

Success in the solution of complex tasks advanced by the party directly depends on the level of work of the primary party organization. The party organization unites 23 shop party organizations. They, noted the speakers, are called upon more actively to influence the activity of the apparatus and to carry out educational work in their labor collectives. Unfortunately, proper attention has not been paid to their work in the review report. Who shows initiative and creativity in work and who behaves passively remained beyond the scope of discussion.

Meanwhile, the poor work of a number of shop party organizations is explained by the fact that the Party Committee has insufficiently examined their activity. Several secretaries of party organizations act, so to speak, with caution toward leaders.

The discussion of the urgent tasks of the sector which took place at the reporting-election meeting successfully showed that the party members of the ministry realistically evaluate the position of the situation. At the same time, it should be noted that many acute problems of the sector were called "general", and criticism in the address of the minister, members of the collegium, and leaders of the subsectors of the ministry was superficial and was insufficiently analytical. Attention was paid also to separate speakers who tried to transfer their own blame to others and explain failures in work only with "objective" reasons.

Communists of the ministry apparatus must not look for excuses for deficiencies and must mobilize inner resources for eliminating them and improving work by this requirement in order to correct the situation created in the sector and lead it out of failure.

The work of the Party Committee for the period under review was acknowledged by the Communists to be satisfactory. It is believed that the newly selected Party Committee will accept this evaluation as an advance on the future and direct all organizational, political, and economic forces and all the energy of the workers of the sector staff so that with the best results, the plan of the current year will be accomplished by increasing the tempo and the 12th Five-Year Plan will be entered.

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12410

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## NEW SULFURIC ACID PLANT IN CHARDZHOU

Moscow SELSKAYA ZHIZN in Russian 15 Jan 86 p 1

[TASS report from Chardzhou under the "In Our Own Country" rubric: "In a Single Rhythm"]

[Text] A complex for the production of sulfuric acid has come on stream at the Chardzhou chemical plant. When its planned capacity is put into production, calculated at 500,000 tons of production per year, the output of starting material for mineral fertilizers will be doubled. Due to this, the chemical industry enterprise, which is the largest in Turkmenistan, will completely provide the agriculture of the republic with fertilizers.

Installers from Moscow, Novosibirsk, and other cities of the country worked together with Turkmen construction workers on erecting the important national economic objective. The collectives efficiently used each working minute. By organizing a continuous adjustment of equipment, they expeditiously made available a broad working front for the factories producing parts.

The output of the new complex also serves as a starting material for the production of ammophosphate--a new effective form of mineral fertilizer, the production of which will begin here in this Five-Year Plan.

12410

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## AGROCHEMICAL EFFECTIVENESS OF PHOSPHORUS-CONTAINING COMPOUNDS OBTAINED BY INTERACTION OF PHOSPHATE RAW MATERIALS WITH AMMONIUM SULFATE OR BISULFATE

Moscow AGROKHIMIYA in Russian No 12, Dec 85 (manuscript received 27 Jun 85)  
pp 32-36

[Article by L. V. Sidorina, A. I. Ostanin, T. I. Zavertyayeva, T. S. Galkevich, G. S. Yegorova and L. B. Romanova, Scientific Production Association "Minudobreniya" [Mineral Fertilizers] of the Scientific Research Institute of Fertilizers and Insectogungicides imeni Ya. V. Samoylov]

[Abstract] Phosphate rocks were reacted with ammonium sulfate or bisulfate and then calcined to granules at 400-480°C. The products were largely calcium ammonium trimetaphosphates. The first samples of fertilizer were made from phosphorites and apatites under laboratory conditions, using ammonium sulfate. Initial samples had 16-25% total phosphate ( $P_2O_5$ ), with 55-84% available (citrate soluble). The total phosphate could be increased to 29-32% by adding ammonium phosphate prior to calcination. Later samples were produced from phosphorite using ammonium bisulfate under pilot-plant conditions. Samples produced without and with the addition of phosphoric acid prior to calcining had total phosphorus content of 20.5 and 29.5%. Available phosphorus in these samples was 81 and 86% respectively; nitrogen was low (2-3%). Pilot-plant samples were also prepared without calcination; these contained 8.8% nitrogen and 14.3% phosphorous, 71% of which was available. All these fertilizers had stable granules which did not cake in extended storage. The samples of laboratory fertilizer were compared in effectiveness to superphosphate fertilizers for growing spring wheat on peat-podzol soil. Effectiveness was closely related to the amount of available phosphorus, and was equivalent for the two types of fertilizers. Variances in granule size of the laboratory fertilizers from 1-3 mm had no significant effect. The pilot-plant fertilizer was also compared to superphosphate, using spring wheat and very clayey peat-podzol soil or fertile black earth soil. The high-phosphorus pilot-plant fertilizer gave results comparable to the superphosphate in the peat-podzol soil, but was significantly less effective in the black earth soil. Non-calcined pilot-plant fertilizer compared with superphosphate and ammonium nitrate fertilizers on two types of peat-podzol soils gave results comparable to the standard fertilizers.

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COMPLEX PROCESSING OF KOVDORSK APATITE CONCENTRATE TO YIELD FERTILIZERS AND FODDER DIAMMONIUMPHOSPHATE

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86, pp 23-25

[Article by Yu. M. Razvadovskiy, Yu. N. Kupriyanov, A. N. Momonov, A. N. Montvilene, O. V. Neugodova, S. V. Zapolskiy, V. F. Karmyshov and K. I. Zaynetdinov]

[Abstract] In connection with intensified development of the fertilizer industry, it is necessary to expand the base of phosphate crude. Of special interest are the deposits in Kovdorsk containing high levels of magnesium. Laboratory and pilot plant studies were carried out, studying the treatment of Kovdorsk apatite with sulfuric acid to yield phosphoric acid followed by its conversion to diammonium phosphate and phosphomagnesium fertilizers. The phosphomagnesium fertilizer (% being reported  $P_{2O_5}^{total}$  35,  $P_{2O_5}^{utilized}$  33,  $P_{2O_5}^{aqu}$  26, N 11, MgO 6) was field tested showing that both P and N are accessible to the plants; this fertilizer is most effective on soils deficient in magnesium. Figure 1; references 3 (Russian).

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UDC 661.632.11

PRODUCTION OF SUPERPHOS FROM KINGISEPP PHOSPHORITE BY FLOTATION-CHEMICAL  
ENRICHMENT METHOD

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86 pp 25-28

[Article by N. N. Treushchenko, M. Ye. Pozin, N. K. Shuvalova, V. I. Valoven  
and N. I. Rodina]

[Abstract] Phosphorite powder has a low agrochemical effectiveness because its  $P_2O_5$  cannot be easily absorbed by the plants. The most rational approach to this problem is to produce fertilizers with various forms of phosphorus. Superphos satisfies these requirements. It can be obtained by the flotation-chemical enrichment of Kingisepp phosphorite followed by additional activation with phosphoric acid during the granulation process. Study of the kinetics of the breakdown of carbonates and phosphates from Kingisepp deposits showed that it was related to the pH value of the medium: at pH above 2.5, the breakdown of carbonates exceeded manyfold the breakdown of phosphates; at lower pH their breakdown was about the same. Production of superphos by the flotation-chemical method includes preparation of the ore, anion flotation, treatment with  $H_2SO_4$  of the anion, concentration, cation flotation to remove insoluble impurities and granulation with additional activation. Other ores can be used to produce superphos by this method. Figures 2.

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UDC 541.127:631.859.13

CALCULATION OF PRODUCT COMPOSITION FROM THERMAL DESTRUCTION OF MONOAMMONIUM PHOSPHATE

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 1, Jan-Feb 86  
(manuscript received 19 Jul 84) pp 40-44

[Article by Yu. F. Zhdanov, Scientific Production Association "Minudobreniya" Moscow]

[Abstract] A number of reactions are listed which occur during dehydration of monoammonium phosphate (MAP); the products formed are diammonium and monoammoniumpyrophosphates with predominance of the latter. The quantity of water isolated during dehydration of MAP can be calculated from the degree of polymerization. A method was derived for calculating the amount of ammonia formed in the process. Theoretically derived data compared satisfactorily with experimental values. Thus, a theoretically derived method was developed for calculating composition of the product, quantity of the starting material required and the amount of heat necessary for the process. Figures 3; references 5: 4 Russian, 1 Western.

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CSO: 1841/456

UDC 631.589:636.085.3

BALANCE OF DRY WEIGHT OF HYDROPONICALLY GROWN FEED UNDER DIFFERENT METHODS OF CULTIVATION

Moscow DOKLADY VSESOYUZHNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENINA in Russian No 1, Jan 86 (manuscript received 19 Dec 84) pp 19-21

[Article by A. S. Obraztsov, S. N. Piutkin, and N. I. Georgiadi, All-Union Order of Labor Red Banner Scientific Research Institute of Feed imeni V. R. Vilyams]

[Abstract] The dry weight before and after cultivation of feed grown on apparatus FVP1000 MK III-M was determined. This apparatus had a area of 30 m<sup>2</sup> and provided a cultivation area on trays of 200 m<sup>2</sup>. Air temperature was kept at 17-19°C. Illumination intensity was 10-500 lux, depending on tray placement. Each tray held seedlings from 1.7 kg of three varieties of barley with 92-97% germination. After 8 days cultivation with spraying of nutrient solutions, entire sample trays were minced and dried to constant weight at 105°C; this avoided the problem of nonrepresentative samples and showed a 19-20% loss of dry weight. Up to 7% of this loss was due to leaching of soluble compounds by the nutrient solution itself, but the bulk of the loss was due to respiration. These losses continued throughout the time of cultivation and were not compensated by increasing the level of nutrients or by adding growth promoters. The overall loss could be reduced to about 10% by the use of aeroponic feeding, using a special nozzle to form the nutrient solution into a mist and thus avoid liquid solution running over the growing barley. Supplementary experiments with illumination levels as high as 17,000 lux showed that a positive dry weight balance could only be obtained by a combination of low seeding density (1 kg/m<sup>2</sup>) and illumination levels at 9500 lux or higher -- this was not economical because of the high energy requirements. At normal seeding densities (2.5-4 kg/m<sup>2</sup>), the loss of dry weight was 7.3-16.7%, with the more dense seedlings showing higher losses. Overall, avoiding situations where nutrient sprays leach the growing plant mass can improve the dry weight balance. References 8: 1 Bulgarian, 7 Russian (1 by Czech author).

12762/12955  
CSO: 1841/397

UDC 661.717.5:636;087.7

DEVELOPMENT OF TECHNOLOGY FOR FINELY DISPERSED CARBAMIDE FOR FORMULA FODDER  
INDUSTRY

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86 pp 21-23

[Article by G. P. Gerbert, G. N. Zinovyev, L. M. Morozova, N. S. Mardagalimova,  
Ya. M. Shulman, V. I. Melnikov and L. A. Kamneva]

[Abstract] One of the factors responsible for slow growth of formula feed production is the shortage of protein components. Carbamide with particle size up to 1 mm is an important source of protein supplement. Results were reported of a study aimed at development of additives assuring 100% friability of the product and design of a granulator yielding the carbamide with predetermined size of granules. Uresort-150 and carbamido-formaldehyde resin were the most effective additives assuring 100% friability. A special granulator was designed with a centrifugal atomizer producing carbamide with a predetermined granulometric composition. Figures 3; references 5 (Russian) (1 by Western author).

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CSO: 1841/474

UDC 637.52.074:548.4:546.48

EXTRACTION PHOTOMETRIC METHOD OF DETERMINING CADMIUM IN MEAT PRODUCTS

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 41, No 1, Jan 86  
(manuscript received 28 Dec 84) pp 69-73

[Article by A. N. Krylova, V. N. Zhulenko and M. A. Malyarova, Moscow  
Technologic Institute of Meat and Dairy Industry]

[Abstract] A simple, reliable and readily reproducible method of determining cadmium at the maximum permissible level (0.05 mg/kg in the USSR) in meat products is described and discussed. The method is based on wet combustion of samples and extraction separation of cadmium in the form of diethyldithiocarbamate with its subsequent re-extraction and final determination in the form of a complex compound with 2,1'-dipyridyl. The limit of cadmium dithizone detection is 0.005 mg/kg and that of 2,2'-dipyridyl is 0.05 mg/kg. The second and third stages of the procedures require 20 minutes and 6-8 samples can be analyzed at the same time. Analyses may be performed in 60 minutes. References 12 (Russian).

2791/12955

CSO: 1841/454

UDC 537.226.33:546.815:621.315.612

PRODUCTION OF LEAD AND LANTHANUM ZIRCONATE-TITANATE BY HOMOGENIZATION AND DISPERSION OF THEIR HYDROXYPOLYMERS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 52, No 2, Feb 86  
(manuscript received 13 Jun 84) pp 134-137

[Article by V. N. Vigdorovich and A. A. Lobanov, Moscow Institute of Electronic Technology]

[Abstract] In addition to monocrystals with high purity, homogeneity and perfect structure, present electronics technology requires highly dispersed homogeneous polycrystalline materials. A synthetic method for such crystals was described based on hydroxypolymer and pyroxohydroxypolymer synthesis of starting powders. One of the best examples of such a process is the synthesis of lead and lanthanum zirconate-titanate used in light modulating electronic equipment. The stability of hydroxypolymers was directly related to the ratio of cation charge to its radius and inversely related to the tendency of anions to form acidocomplexes with cations and of the cations to compensate oxygen electronegativity. Formation of hydroxypolymers occupies the entire volume of the solution leaving no mother liquor at all. After hot pressing, polycrystalline material was formed consisting of small crystals passing through 67-69% of the light at wavelength 0.630  $\mu\text{m}$ . References: 9 Russian (1 by Western authors).

7813/12955  
CSO: 1841/469



UDC 546.881

SYNTHESIS AND X-RAY STUDY OF POLYVANADATES AND POLYVANADATOMOLYBDATE GEL FILMS

Moscow ZHURNAL NEORGANICHESKOY KHIMII in Russian Vol 31, No 2, Feb 86  
(manuscript received 12 Jun 84) pp 378-382

[Article by V. L. Volkov, G. S. Zakharova, V. G. Zubkov and A. A. Ivakin,  
Institute of Chemistry, Ural Scientific Center, USSR Academy of Sciences]

[Abstract] The goal of this study was to obtain alkali metal polyvanadate gel films with general formula  $M_2V_{12}O_{31} \cdot nH_2O$ , to replace vanadium by molybdenum and to determine their x-ray characteristics. Thermal stability of polyvanadatomolybdates was higher than that of polyvanadates. These compounds have a layered structure with characteristic separation between the layers which decreases with increasing ionic radius of the alkaline metal and appears to be dependent on the ability of  $M^+$  ions to become hydrated. The layered structure of these gels along with inclusion of hydrated monovalent ions and vanadium in two oxidation states show the similarity of these compounds with oxidated vanadium bronze  $M_xV_{12}O_{30}$ . Figures 4; references 8: 2 Russian, 6 Western.

7813/12955  
CSO: 1841/468

UDC 669.018.45:548.55:338.45

# USE OF REFRACTORY COMPOUND CRYSTALS IN INDUSTRY

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85, pp 556-560

[Article by P. S. Kislyy, corresponding member, Ukrainian SSR Academy of Sciences]

[Abstract] A discussion is presented of the major uses of crystals of refractory compounds in industry. These compounds are used as abrasive materials, cutting tools, temperature-resistant materials and structural materials. Refractory-compound-based composites may be superior to refractory powders as abrasive particles. They have clear advantage over diamond and cubonite in terms of the smoothness of surfaces worked. The introduction of rigid drive-tool-part systems and vibration-resistant high power machine tools has allowed the broad use of hard alloys and mineral ceramics as cutting tools, allowing intensification of cutting processes. Examples of refractory materials used as heating elements and thermocouple covers are noted. New structural ceramic materials based on super-hard refractory substances have great advantages over refractory alloys. References 15: 13 Russian, 2 Western.

6508/12955  
CSO: 1841/377

EVALUATION OF BINDING PROPERTIES OF AQUEOUS CERAMIC SUSPENSIONS USING AN ELECTRIC MODEL

Novosibirsk IZVESTIYA NOVOSIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian No 1, Jan 86 (manuscript received 15 Aug 84) pp 110-114

[Article by P. L. Mityakin and O. N. Rozental, Division of Physicotechnical Problems in Metallurgy, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Measurements were conducted on the changes in the active components of dielectric permeability of an aqueous silicon dioxide ceramic suspension as an approach toward evaluation of binding properties. The observed dispersion of the megahertz field was directly related to the pH value and was interpreted to indicate the formation of ion-molecular oligomers. Such oligomers possess uncompensated electrical moments with relaxation times that are  $10^2$  to  $10^3$ -fold greater than those of free water. Proton exchange represents a possible explanation for the mechanism of electrical polarization of these oligomers, since its frequency ( $10^5$  to  $10^7$  sec<sup>-1</sup>) falls within the observed dispersion. It appears that measurements of changes in dielectric permeability may be used to monitor and predict binding strength of such ceramic binders. An equation has been derived for wedge-shaped plots yielding linear plots in the field frequency of 1 to 20 MHz within the pH range of 3.3-9.0 for estimating binding strength. Figures 2; references 13: 11 Russian, 2 Western.

12172/12955  
CSO: 1841/478

UDC 546.562+621.357.5

ELECTRICAL RESISTANCE OF FILMS PREPARED BY DECOMPOSITION OF HEAT-SENSITIVE  
COPPER SALTS

Novosibirsk IZVESTIYA NOVOSIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA  
KHIMICHESKIYE NAUKI in Russian No 1, Jan 86 (manuscript received 31 Jan 85)  
pp 106-110

[Article by S. G. Mamylov and O. I. Lomovskiy, Institute of Solid Body  
Chemistry and Mineral Processing, Siberian Department, USSR Academy of  
Sciences, Novosibirsk]

[Abstract] An evaluation was conducted on the effects of heat in the 120-  
150°C range on the electrical resistance of copper metallized glass-Textolite  
sheets, employing decomposition of copper hypophosphite for the metallization  
process. The electrical resistance of the copper film fell within the 40-  
300 ohm range, with minimal resistance recorded when the temperature of the  
process was maintained in the 120-130°C range. Complete decomposition of  
the heat-sensitive copper salt occurred in 8 min, with marked oxidation of  
the copper film evident if the process was prolonged to 20 min. Introduction  
of the surfactant OP-4 into the reaction solution resulted in a more homo-  
genous copper film over the glass-Textolite support; however, the resistance  
of the film was increased to 300 ohm under otherwise optimal conditions.  
Full coating of the glass-Textolite samples was assured by a 1M copper hypo-  
phosphite solution equivalent to 10  $\mu$ liters/cm<sup>2</sup> surface area. Figures 5;  
references 6: 5 Russian, 1 Western.

12172/12955  
CSO: 1841/478

UDC 621.771.2.09+621.794.441+621.794.48

USE OF ELECTRODIALYSIS IN LOW TEMPERATURE HYDROCHLORIC ACID ETCHING OF CARBON STEEL

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA  
TEKHOLOGIYA in Russian Vol 28, No 9, Sep 85 (manuscript received 6 Oct 82)  
pp 62-65

[Article by V. P. Kochergin, I. N. Zagurskaya, S. P. Panasenko and T. F. Moiseyeva, Department of Inorganic Chemistry, Urals State University imeni A. M. Gorkiy]

[Abstract] Results are summarized from studies of the etching of carbon steels type 0,3,20,30,60 and 80 at 293-298 K in a solution of hydrochloric acid in the presence of iron chloride. The content of iron chloride (III) in the solution was maintained constant by electrodialysis with ion exchange membranes. The technological parameters of low temperature hydrochloric acid etching established in the laboratory were tested on a pilot-scale installation at the Orlov Steel Rolling Mill. Productivity of this installation was 0.85 tons of etched metal per hour. This represents the first pilot scale plant for continuous low-temperature hydrochloric acid etching of carbon steel not requiring heating of the working solution, or consumption of large quantities of acid and water, yielding powdered iron and maintaining constant etching solution composition. Figures 4, references 9: Russian.

6508/12955  
CSO: 1841/332



UDC 661.143(088.8)520

INFLUENCE OF SYNTHESIS CONDITIONS ON DISPERSED COMPOSITION OF YTTRIUM OXIDE  
LUMINOPHOR

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 51, No 11, Nov 85  
(manuscript received 6 June 84) pp 1224-1226

[Article by N. I. Smirdova, T. V. Smityukh, O. G. Papasovchenko, Fam Tkhi Min  
Chau and I. R. Magunov, Physical Chemistry Institute, Ukrainian SSR Academy  
of Sciences, Odessa]

[Abstract] A study is presented of the variation in particle-size distribution of the luminophor as a function of the addition of organic acids, surfactants and solution pH of precipitation of yttrium and europium oxalates. The light-producing characteristics of the luminophors were measured. The surfactants used were copolymers of ethylene and propylene oxides, lauryl sulfate and sulfonate and various cationic surfactants. Almost all the surfactants facilitated an increase in mean luminophor grain size. Acidity was studied at pH 1 to 6. At pH 3-6 the share of smaller fractions increased greatly. At pH 5-6 the medium fraction of luminophors also increased. The particle size distribution was best at pH 1-2. References 11: 4 Russian, 7 Western.

6508/12955  
CSO: 1841/319

## STUDY OF PURGING PROCESS FOR HYDRIDE ACCUMULATOR OF HYDROGEN

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 1, Jan-Feb 86  
(manuscript received 21 May 85) pp 49-52

[Article by V. S. Lukyanchikov and A. V. Kolesnichenko, Gas Institute, UkSSR Academy of Sciences, Kiev]

[Abstract] "Hydride accumulators of hydrogen", the term preferred by these authors to the English "hydrogen tank", serves as a storage vehicle for the gas in a bound state, in form of intermetallic hydrides. These "accumulators" are more compact and safer than standard hydrogen bottles. Decomposition of the hydride phase leads to the production of pure hydrogen. This is an important issue for high sensitivity equipment such as flame ionization detectors in chromatography. Microadmixtures were nevertheless noted by super-sensitive detectors. When hydrogen is removed from the accumulator, a sort of purging occurs of its free volume and the composition of gas phase is changed. Qualitative analysis of this process was attempted concentrating on oxygen, methane and  $\text{CO}_2$  as possible microimpurities. On the basis of this analysis, it was shown that it is possible to use this  $\text{H}_2$  source for nine hours of continuous operation of a gas chromatograph such as LKhM-8M with a 3% reserve of hydrogen retained for self-purging. Figures 3; references 2: 1 Russian, 1 Western.

7813/12955

CSO: 1841/456

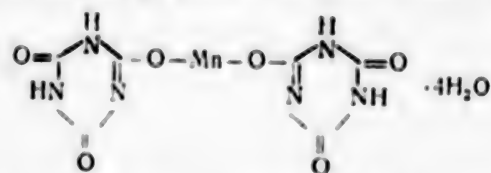
NEW METHOD OF OBTAINING MONOMANGANESE SALT OF CYANURIC ACID

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 38, No 12, Dec 85, p 758

[Article by S. M. Kazaryan, G. T. Yesayan, V. B. Cavalyan and M. B. Ordyan, Institute of Organic Chemistry, Armenian SSR Academy of Sciences, Yerevan; Yerevan State Medical Institute]

[Text] A new method of obtaining the monomanganese salt of cyanuric acid (MSCA) by means of the reaction of cyanuric acid with a water solution of divalent manganese chloride ( $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ ) in the presence of a water soluble aliphatic amine is proposed. The new method of obtaining MSCA allows the process to be conducted at lower temperatures ( $20-22^\circ$ ) and in a significantly shorter reaction time (0.3-0.5 hr.).

The structure of the obtained product is confirmed by IR spectroscopy,



thermogravimetric analysis (TGA), and elemental analysis.

It is established that under conditions of isothermal heating in the interval  $140-260^\circ$ , the only product of MSCA decomposition is water, and in the interval  $260-405^\circ$ , cyanuric acid. On the basis of TGA data, the hypothesis is made that in air, in the interval  $405-520^\circ$ , besides the splitting off of the second cyanuric acid group, further oxidation of the Mn contained in MSCA occurs.

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/12955

CSO: 1841/394-P

UDC 534.547.495.1'122.07

INTENSIFICATION OF ORGANIC REACTIONS IN ULTRASONIC FIELD. PART 1. REACTION OF SODIUM SALT OF PENTAMETHYLENE THIOCARBAMINIC ACID WITH ALKYLCHLORIDES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 12, Dec 85  
(manuscript received 20 Feb 84) pp 2973-2977

[Article by R. B. Valitov, R. N. Galiakhmetov, A. K. Kurochkin and M. A. Margulis, All-Union Scientific Research and Technologic Institute of Herbicides and Plant Growth Regulators; All-Union Scientific Research Institute of Organic Synthesis]

[Abstract] A study was made of the basic kinetic regularities in the reactions of the sodium salt of pentamethylene thiocarbaminic acid (I) with alkylchlorides with and without ultrasonic waves present in an aqueous medium. The rate constants and activation energies of the reaction were determined, indicating that the ultrasonic waves do intensify the reactions. The effect becomes significant at over  $1\text{W}/\text{cm}^2$  ultrasonic wave intensity, indicating that it is related to cavitation. The common second order of the reaction indicates the formation of intermediate compounds or complexes. The increased reaction rate and decreased activation energy may indicate catalytic effects of ultrasound or a significant contribution of radical products formed within cavitation bubbles. Figures 5; references 4: 3 Russian, 1 Western.

6508/12955  
CSO: 1841/366

UDC 547.582.4:542.934

STUDY OF DIRECT HYDRATION OF BENZONITRILE TO BENZAMIDE

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 3, May-Jun 85  
pp 49-51

[Article by Ya. G. Abdullayev, A. K. Akhmedov, G. N. Suleimanov, A. Sh. Novruzova, F. M. Abdurakhmanova, Institute of Petrochemical Processes imeni Yu. G. Mamedaliyev, Azerb Academy of Sciences]

[Abstract] A detailed study is presented of direct catalytic hydration of benzonitrile synthesized by oxidative ammonolysis of toluene. The reaction of direct hydration of benzonitrile to benzamide was studied in a flow-through system at 160-240°C, pressure 10-30 atm, nitrile/dioxane ratio 1:1.5 to 1:3, space velocity of nitrile-dioxane mixture 0.5-1.75/hr. The influence of temperature, raw material, feed space velocity, pressure and reagent ratio on the course of the reaction was studied. Optimal conditions were found for producing benzamide: 180°C, space velocity 0.75/hr raw material, 0.3/hr water, pressure 20 atm, benzonitrile/dioxane ratio 1/3. Under these conditions the yield of the end product is 97.86%. References 9: 1 Russian, 8 Western.

6508/12955

CSO: 1841/365



#### ALL-UNION CONFERENCE ON AZINE CHEMISTRY

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 1, Jan 86  
pp 129-130

[Article by O. N. Chupakhin]

[Abstract] The 2nd All-Union Conference on Azine Chemistry was held on June 18-20, 1985, in Sverdlovsk. The conference was attended by approximately 200 scientists from various areas of the USSR who heard 23 plenary reports and visited some 157 poster sessions. Most of the topics covered at the conference dealt with the synthesis of azine systems and presented many novel and unique approaches to the problem. Other sessions and communications covered theoretical concepts as they relate to the azines, in particular tautomerism, quantum chemistry, and various spectroscopic modalities. Finally, a third major group of reports were concerned with reactivity and behavior in various systems, and were supplemented by the poster sessions which presented many novel reactions and mechanisms. However, the conference also noted that Soviet azine chemistry is underrepresented in terms of structure-activity studies, in the synthesis of natural compounds in this chemical class and compounds with complicated structures, as well as in a shortage of studies on reactions in the gas phase. There was unanimous agreement as to the need for a section on heterocyclic chemistry in the Scientific Council for Fine Organic Synthesis of the USSR Academy of Sciences, and for a 3rd All-Union Conference on this topic to be held in 1988 or 1989.

12172/12955  
CSO: 1841/444

UDC 541.135.27+541.49

SOLVENT EFFECT ON ELECTROCONDUCTIVITY OF POTASSIUM RHODANIDE COMPLEXES WITH CROWN ETHERS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 52, No 2, Feb 86  
(manuscript received 2 Nov 83) pp 207-209

[Article by V. V. Kryukov, Yu. A. Tarasenko, Yu. Ya. Fialkov and V. L. Chumak, Kiev Polytechnic Institute]

[Abstract] Literature data concerning the effect of complex formation of alkali metals with crown compounds on conductivity of solutions are limited. Effect of various solvents on specific electroconductivity of potassium rhodanide complexes with dibenzo-18-crown-6 and 18-crown-6 was studied using the following solvents: acetonitrile, dimethylsulfoxide and propylene carbonate as well as their mixture with chlorobenzene. Electroconductivity changed with increased concentration of the crown until the point of equimolar ratio was reached between potassium rhodanide and crown ether; further increase in the concentration did not affect electroconductivity showing that the stoichiometric point of the complex formation was reached. Analysis of the relationship of electroconductivity corrected for viscosity to reverse dielectric permeability of mixed solvents illustrated the influence of physical and chemical properties of the solvents on the complex formation process and electroconductivity of such systems. Figures 2; references 10: 4 Russian (2 by Western authors), 6 Western.

7813/12955  
CSO: 1841/469

UDC 546.56+577.164.1:543.257.1+519.2

COPPER(II) COMPLEXING WITH PYRIDOXAL AND GLUCOSAMINE IN PHYSIOLOGICAL SOLUTION

Moscow ZHURNAL NEORGANICHESKOY KHIMII in Russian Vol 31, No 2, Feb 86  
(manuscript received 18 Jun 84) pp 409-412

[Article by A. M. Agranovich, Ye. V. Isayeva, N. A. Dobrynina, V. G. Gontar  
and S. P. Gladkikh, Moscow State University imeni M. V. Lomonosov]

[Abstract] Pyridoxal (HPal) is a cofactor of many important enzymatic agents. One of them--lysoxidase--is responsible for polymerization of collagen. Reactions of glucosamine (Gl) and HPal in presence of copper (II) ions were studied in physiological solutions by the method of pH-metric titration. In order to describe the equilibrium in solution containing Cu(II) ions, HPal, Gl equilibria in binary systems had to be investigated first. Mathematical models were used to describe equilibria in the following systems:  $\text{Cu}^{2+}$ : Gl=1:1 and 1:3;  $\text{Cu}^{2+}$ :HPal=1:1;  $\text{Cu}^{2+}$ :HPal:Gl=1:1:1 and 1:1:3 by gradual addition of new complex forms. The model based on the  $\text{CuGl}(\text{OH})_2$  form showed a better correlation with the experimental data than a model using the dimer form  $\text{Cu}_2\text{Gl}_2(\text{OH})_2$ . Stability constants of binary complexes were calculated showing that a complex with the Schiff base is formed in the system  $\text{CuPalGl}^+$  with a stability constant  $\lg K = 11.13$ . Figures 2; references 8: 3 Russian (1 by Western author), 5 Western.

7813/12955  
CSO: 1841/468

## PESTICIDES

### YELLOW RAIN OVER HONDURAS

Moscow SELSKAYA ZHIZN in Russian 26 Feb 86 p 11

[Text] Managua. TASS correspondent S. Gorbunov reports information has been received there that ten inhabitants of the northern zone of Honduras were subjected to the noxious activity of dispersed substances which have already been sprayed in this area for several weeks by American military aircraft.

The victims said that they were visited by strange "yellow rain" which caused choking and skin sores. Many indications show that aircraft discharged the highly toxic defoliant "Agent Orange" used by American aggressors during the Vietnam War.

Honduran authorities refused to give any explanation. Moreover, the CIA and Honduran secret services connected with it tried to keep the victims of the "chemical experiments" quiet. One of the victims, a peasant named L. Gutierrez, informed journalists that unfamiliar men threatened to kill him if he told about the aircraft and "yellow rain."

/12955

CSO: 1841/462-P

UDC 547.495:541.127

CATALYTIC EFFECT OF PROTON-DONOR COMPOUNDS IN REAMINATION OF CARBAMIDE WITH ANILINE

Moscow ZHURNAL VSESOUYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA  
in Russian Vol 30, No 6, Nov-Dec 85 (manuscript received 13 Dec 84) pp 583-584

[Article by Yu. A. Strepikheyev, A. L. Chimishkyan, T. V. Leonova and  
Ya. M. Kimelfeld, Moscow Chemical-Technologic Institute imeni D. I. Mendeleyev]

[Abstract] The reaction of carbamide with aniline in o - dichlorobenzene is used as an example to demonstrate the influence of proton donor compounds on the process. Substances in various classes were used as proton donors: mineral acids, carboxylic acids, alcohols and water, with  $tK_a$  varying widely. Proton donor compounds apparently catalyze, primarily, the second stage of the process, reamination of phenylurea by the aniline. References 9: 6 Russian, 3 Western.

6508/12955

CSO: 1841/377

UDC 543.253:543.7

VOLTAMETRIC DETERMINATION OF NITROGEN-CONTAINING HETEROCYCLIC PESTICIDES IN PLANTS, SOIL AND WATER OF NATURAL RESERVOIRS

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 41, No 1, Jan 86  
(manuscript received 18 Dec 84) pp 168-170

[Article by V. N. Kavetskiy and G. G. Andriyenko, Ukrainian Scientific Research Institute of Plant Protection, Kiev]

[Abstract] A voltametric method of determining micro-quantities of BMK [methyl-N-(benzimidazolyl-2) carbamate] and its metabolite 2-AB (2-aminobenzimidazol) and also of determining Benomil [N-(1-butyl-carbomilbenzimidazolyl-2)-O-methyl carbamate] and BMK by 2-AB in farm plants, soil and natural reservoirs is described and discussed. Nitrogen-containing heterocyclic pesticides BMK and 2-AB are oxidized on a graphic electrode in borate buffer solution with half-wave potentials of 0.65 V and 0.35 V respectively. A mixture of BMK and 2-AB gives a clearly-pronounced two-stage wave which makes possible determination of each of these compounds. Height of the BMK and 2-AB wave is linearly dependent upon the concentration. Benomil in borate buffer solutions is converted into BMK or 2-AB and should be determined by the BMK or 2-AB. The method is effective within the range of concentrations from 0.05-10 mg/kg. Figures 2; references 5: 4 Russian, 1 Western.

2791/12955

CSO: 1841/454



UDC 632.95:631.531.172

INTEGRATED CHEMICAL PROTECTION OF GRAIN CROPS FROM DISEASES AS MOST IMPORTANT PREREQUISITE OF INCREASING WHEAT PRODUCTION

Moscow AGROKHIMIYA in Russian No 12, Dec 85 (manuscript received 1 Jul 85)  
pp 103-110

[Article by Yu. N. Fadeyev and Z. I. Zhevite-Kulvetene, All-Union Scientific Research Institute of Applied Molecular Biology and Genetics, Moscow; Lithuanian Agricultural Scientific Research Institute, Kedaynyayskiy Rayon]

[Abstract] Under conditions of intensive cultivation, disease prevention is the major limiting factor on yield. At the earliest stages of plant growth, root rot can stunt the development of embryo grain ears and make plants more susceptible to drought. Fungicide treatment of seeds is critical and often underrated. Tests show yields of barley, rye, and winter wheat can be increased by 13-18% by this action alone; use of baytan-universal is recommended. The use of fungicides, particularly fundazol, during the early growth stages can also significantly improve harvests. During the period of growth and maturing of the ear, protection against aerogenic fungal diseases becomes very important. The most effective treatment for winter wheat was a mixture of fundazol with TUR, which increased yields by 14.6-70.0%. In Lithuania, widespread septoria was successfully treated by repeated applications of benomil (40.4% harvest increase) or topsin (66.4% increase). Likewise, outbreaks of Erysiphe graminis on winter wheat were treated with topsin M (44.2-85.6% increase) or plondrel (61.6-94.5% increase). Barley harvests were also improved by 5.3-7.0 centners/ha by spraying with bayleton. Fundazol has received wide application in Lithuania. Harvests of winter wheat as high as 74.6 centners/ha have been achieved, with 13 rayons achieving harvests over 30 centners/ha. These improvements agree with cited foreign improvements, which also recommend mixtures of systemic and contact fungicides to protect against multiple diseases. References 17: 3 Czech, 1 East German, 12 Russian, 1 Western.

12762/12955  
CSO: 1841/402

## PETROLEUM PROCESSING TECHNOLOGY

### NEW OIL AND GAS DEPOSITS DISCOVERED IN YAMAL

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jan 86 p 2

[TASS report by Kharosavey, Yamalo-Nenetskiy Autonomous Okrug, "Yamal Is Being Developed Dependably"]

[Text] A new deposit of gas has been plotted on the geological map of Western Siberia--the Malygin, prospected on the northern part of the Yamal Peninsula. Now, in addition to the Malygin, nine more deposits of oil, gas, and gas condensate have been identified on the peninsula. The main discoveries, however, still lie ahead; indeed Yamal has been little studied up to now. Its raw material reserves are located closest of all to consumers in the northern region of the European part of the country. Their exploitation will make it possible to establish a large-scale mining industrial complex in the polar and circum-polar Urals. Therefore, all three expeditions of the association developing the peninsula--Kara, Yamal, and Tambey--will increase the volume of boring in 1986. Basic work will expand at the Bovanenkov deposit. Its gas reserves have already been confirmed.

The Ministry of the Maritime Fleet will provide year-round delivery to the peninsula of equipment, materiel, and housing.

Permafrost and deep frosts pose considerable challenges for gas workers. But they take into account the general scheme of the preparation of Yamal for development.

12410

CSO: 1841/470

UDC 547.1-125.542.924.661.183.6

INFLUENCE OF DEGREE OF CRYSTALLINITY OF PENTASIL ON ACTIVITY IN CRACKING OF N-OCTANE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 12, Dec 85  
(manuscript received 30 Jan 84) pp 2952-2956

[Article by V. V. Yushchenko, K. V. Topchiyeva, deceased, L. D. Korovalchykov, B. K. Nefedov, L. A. Kasyanova and V. I. Trunova, Chemistry Faculty, Moscow State University imeni M. V. Lomonosov

[Abstract] A study was made of the catalytic and acidic properties of zeolite-containing systems based on Soviet high-silicon zeolites TSVK obtained by interrupting synthesis at various stages, allowing wide variation of the relationship between the crystalline and amorphous phases. Acid properties were studied by thermal desorption of ammonia. Catalytic properties were studied in a model reaction of cracking of n-octane by a straight-run method. The selectivity of the catalyst was studied at 450°C in the interval of degree of transformation 0.05-0.60. Selectivity of all specimens in the stable activity area was found to be independent of time. A nonlinear increase in  $k_{eff}$  was found with an increase in the degree of crystallinity. The yields of methane, ethane, propane and n-butane were independent of crystallinity; the yield of ethylene, propylene and isobutane increased, that of butylenes and  $C_5$  hydrocarbons decreased with increasing crystallinity. Figures 2; references 12: 4 Russian, 8 Western.

6508/12955  
CSO: 1841/366

UDC 547.14+66.094

PREPARATION OF MONOMERIC CYCLOOLEFINS FROM LIQUID PYROLYTIC PRODUCTS

Baku DOKLADY AKADEMII NAUK AZERBAYDZHANSKOY SSR in Russian Vol 41, No 10,  
Oct 85 (manuscript received 8 Jun 84) pp 50-54

[Article by A. G. Gasanov, S. D. Mekhtiyev, academician, Azerbaijan SSR  
Academy of Sciences, E. T. Suleymanova, L. I. Kasumov, F. A. Pashayeva, M. I.  
Mirgasanova and R. R. Aliyev, INKhP (Institute of Petrochemical Processes)  
imeni Yu. G. Mamedaliyeva, Azerbaijan SSR Academy of Sciences]

[Abstract] A running commentary is provided on the economic advantages of utilizing pyrolytic hydrocarbons produced at petrochemical plants. The advantages of monomeric cycloolefins produced from cycloienes of the  $C_5$  liquid fraction receive special attention, as they can be processed into cyclopentene and norbornene. Cyclopentene has already found use in the production of synthetic rubber, while norbornene is suitable for copolymerization with styrene, ethylene, propylene, vinyl chloride, etc., and the formation of highly desirable elastomers. The alkenes and alkadienes in the  $C_5$  fraction can be processed into synthetic lacquers, while other hydrocarbons with high boiling points are promising as solvents. References 5: 1 Czech, 4 Russian.

12172/12955  
CSO: 1841/447

UDC 628.3:541.183

TECHNOLOGY OF WASTE-FREE PURIFICATION OF EXPANSER GAS CONDENSATE FROM ARSENIC IMPURITIES

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86 pp 38-39

[Article by V. I. Vlasova and Ye. P. Petryayev]

[Abstract] As(III) can be removed from expander gas condensate only on strong anion exchange columns, the best of which is AV-17-8. However, hydrocarbonates present in such a gas compete with arsenic and therefore they must be removed by passage of the effluent over a cation exchange column. A technological evaluation was proposed for the overall process. Laboratory data were verified by industrial evaluation yielding high quality purified water with considerable net savings. Figure 1; references 6: 5 Russian, 1 Western.

7813/12955

CSO: 1841/474

UDC 665.521.5:621

DETERGENT PROPERTIES OF MOTOR OILS FOR METHANOL-DRIVEN ENGINES

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 2, Feb 86, pp 29-30

[Article by V. L. Lashkhi, L. V. Borenko, V. N. Dneprov and A. N. Yershova]

[Abstract] This study was limited to the evaluation of the effect of formic acid (derived from methanol as an undesirable byproduct of internal combustion) on the quality of motor oil. Individual parameters required for the model, developed in another study, were determined on a laboratory setup and then corrected with data from single cylinder engines. The results showed that detergent properties of engine oil do not deteriorate significantly when the engine is run on methanol. To avoid even these negative effects, high quality oils should be used, for example, group G instead of group V. References 5: 3 Russian, 2 Western.

7813/12955

CSO: 1841/473



UDC 665.637:338.45

USE OF ECONOMIC-MATHEMATICAL METHODS FOR DETERMINATION OF OPTICAL DEPTH OF  
PETROLEUM PROCESSING

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 2, Feb 86, pp 31-33

[Article by S. G. Ashitko, G. A. Terentyeva, L. G. Zlotnikova, V. I. Rodionov,  
All-Union Scientific Research Institute of Petroleum Processing, Moscow;  
Institute of Petrochemical and Gas Industry imeni I. M. Gubkin]

[Abstract] A linear programming method was proposed for the development of an economic-mathematical model for petroleum processing. Flexibility and dynamics of this model were achieved by changing the information input on capital investment for starting crude, targeted end products and alternate fuels. The following components comprise the model: mining and transportation of crude oil and gas, processing, production of consumer goods. Quality control indices were developed for the final products. All the factors entering this process were analyzed by special computer programs. Using this principle, optimal processing characteristics could be determined with consideration of capital investment, primary and secondary processes and desired qualities of the end products. Figures 2; references 4 (Russian).

7813/12955

CSO: 1841/473

LOWERING CAPITAL INVESTMENT IN DESIGNING PLANTS/EQUIPMENT FOR PRODUCTION OF  
OIL ADDITIVES

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 2, Feb 86 pp 2-4

[Article by A. S. Zhurba and G. I. Burlaka, Masina Scientific Production Association]

[Abstract] High capital investments characterize current developments of the national economy. An important way of saving the resources is based on reconstruction and technical refitting of the existing plants. An in-depth analysis of various means available for saving capital investment was given along with suggestions for planning purposes. In the past, 310 days of equipment operation was a standard for all industries. More precise estimates should lead to savings. Placement of some equipment under open skies was another suggestion for achieving savings; other savings could be realized by proper selection of the crude material, effective use of fuel and other energy resources, uninterrupted flow of crude supply and the use of secondary resources (recycling). Introduction of large scale continuous operations could lead to considerable savings. References 7 (Russian).

7813/12955  
CSO: 1841/473

UDC 665.76.038.5  
665.775.038.5

INFLUENCE OF MEDIUM ON PROTECTIVE EFFECTIVENESS OF INHIBITORS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 11, Nov 85 pp 10-12

[Article by N. P. Spirkina, I. A. Timokhin and T. Z. Tabasaranskaya, Moscow Institute of the Petrochemical and Gas Industry]

[Abstract] A study was made of the effectiveness of corrosion inhibitors with various functional groups in oil and bitumen. The oil-soluble inhibitors used were calcium, alkylbenzene sulfonate, akor-1 and VNKh-1. The sulfonate-type inhibitor is most effective in oil but less effective in bitumen compositions. VNKh-1 is ineffective in oil solutions but quite effective in bitumen systems. Akor-1 was effective in oil and bitumen. References 2 (Russian).

6508/12955  
CSO: 1841/348

UDC 665.642.986

COMBINED PYROLYSIS OF GASEOUS PARAFFIN HYDROCARBONS IN INDUSTRIAL FURNACES

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 11, Nov 85 pp 16-18

[Article by T. N. Mukhina, P. F. Avdonin, S. N. Yoronkov, N. S. Belousov, N. L. Barabanov, G. P. Kreynina, V. H. Gorshkov and A. N. Sivash, deceased, Voronezh PNU of the "Orgneftekhimzavody" Trust; All-Union Scientific Research Institute of Organic Synthesis; Shevchenko Plastics Plant]

[Abstract] Combined pyrolysis of ethane and propane was performed at 800-810°C, dilution of raw material with steam 0.3-0.4 kg/kg of raw material. The content of propane in the ethane-propane mixtures was 0-40 mol. %. As the fraction of propane in the raw material increases, the conversion of ethane tends to decrease, while the conversion of propane remains practically the same level, 90-95 weight percent. The effectiveness of the process can be well characterized by its selectivity. In spite of the decrease of conversion of ethane with increasing propane fraction in the raw material, pyrolysis of ethane-propane mixtures with the addition of the methane-hydrogen fraction causes a slight decrease in absolute ethylene yield in comparison to the calculated yield assuming additive conditions for pyrolysis of individual ethane and propane. Figures 3; references 4: 2 Russian, 2 Western.

6508/12955

CSO: 1841/348

UDC 542.91:547.824:548.737

SYNTHESIS OF NEW STEROIDS, RELATED TO TYPES OF 15- AND 17- THIAESTRONE AND 15- AND 17- THIAANDROSTANE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 22, No 1, Jan 86  
(manuscript received 1 Aug 84) pp 121-132

[Article by G. A. Tolstikov, Ye. Ye. Shults, Yu. T. Struchkov, D. S. Yufit and S. V. Lindeman, Institute of Chemistry, Bashkir Branch, USSR Academy of Sciences, Ufa]

[Abstract] Experimental synthesis of the new steroids is described and discussed. Diene synthesis between 1-vinyl-6-methoxy-3,4-dihydronaphthalene (I) and 2-thiolene-4-one-S,S-dioxide (IIa) proceeds with shift of the double bond from position 9 (11) to position 8 (9) and yields 3-methoxy-15-thiadioxide-18-nor-13 $\beta$ ,14 $\beta$ -estra-1,3,5(10),8(9)-tetraene-17-one (III) and 3-methoxy-17-thiadioxide-18-nor-14 $\beta$ ,13 $\beta$ -estra-1,3,5(10)8(9)-tetraene-15-one (IV). Addition reaction (I) with 3-methyl-2-thiolene-4-one-S,S-dioxide (IIb) leads exclusively to 3-methoxy-15-thiadioxide-estra-1,3,5(10),8(9)-tetraene-17-one. Reduction of the steroid ketones obtained by the effect of NaBH<sub>4</sub> first and then by Kursanov-Parnes reagent gave derivatives of 15-thia-14 $\beta$ - and 15(17)-thia-18-nor-14 $\beta$ b-estrathienol which were converted into 15(17)-thia-19-nor- and 18,19-bisnorandrostenolones. Reaction of the diene (I) with 5-benzylidene-2-thiolene-4-one-S,S-dioxide (IIc) yields a mixture of structural polymers, produced by counter synthesis by condensation of compounds (III) and (IV) with benzaldehyde. X-ray study of compound (IV) is presented. References 15: 10 Russian, 5 Western.

2791/12955

CSO: 1841/452

UDC 547.672.6

REGIOSELECTIVE REACTIONS OF 9-HYDROXY-10-CHLORO-1,4-ANTHRAQUINONE. SYNTHESIS OF DIGITOPURPONE AND ISLANDICINE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 22, No 1, Jan 86  
(manuscript received 13 Dec 84) pp 147-156

[Article by M. V. Gorelik, L. V. Arinich, O. I. Kotlyarevskiy and Ye. A. Feskova, Scientific Research Institute of Organic Intermediates and Dyes, Moscow]

[Abstract] The possibility of directional synthesis of digitopurpone from 1,4-dihydroxyanthraquinone and--in combination with a regioselective reaction between 5-nitro-1,4-dihydroxyanthraquinone and  $\text{SOCl}_2$ --of islandicine, is described and discussed. 9-Hydroxy-10-chloro-1,4-anthraquinone, obtained by interaction of 1,4-dihydroxy-9,10-anthraquinone and thionyl chloride is nitrated in the peri-position relative to the chlorine atom with conversion into 5-nitro-9-hydroxy-10-chloro-1,4-anthraquinone. Isomeric 8-nitro-9-hydroxy-10-chloro-1,4-anthraquinone forms during hydrolysis of the product of nitration and subsequent reaction of 5-nitro-1,4-dihydroxy-9,10-anthraquinone and thionyl chloride. Interaction of 9-hydroxy-10-chloro-1,4-anthraquinone and its nitrosubstituted derivatives with carbanion generated from malonic ester leads to selection alkylation in position 3. Combination of these reactions makes it possible to achieve regioselective synthesis of 2-methyl-1,4,8,- (digitopurpone) and 2-methyl-1,4,5-trihydroxy-9,10-anthraquinone (islandicine). References 23: 8 Russian, 15 Western.

2791/12955  
CSO: 1841/452



UDC 541.515:547.269.1

REACTION OF CERTAIN MERCAPTO COMPOUNDS WITH STABLE DIPHENYLPICRYLHYDRAZYL  
RADICAL

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 51, No 11, Nov 85  
(manuscript received 25 Apr 84) pp 1203-1206

[Article by V. A. Portnyagina, V. Ya. Pochinok, H. L. Tarakhovskiy, T. V. Pochinok, V. A. Vonsyatskiy, F. P. Trinus, A. I. Aleksandrova and V. K. Karp, Scientific Research Institute of Pharmacology and Toxicology, Kiev; Kiev University; Scientific Research Institute of Pediatrics, Obstetrics and Gynecology, Kiev]

[Abstract] A quantitative estimate is presented of the antioxidative properties of certain mono- and dithiols in model experiments in vitro by use of the stable diphenylpicrylhydrazyl (DPPH) radical, an intensively colored crystalline substance with maximum absorption at 520 nm. A kinetic equation is developed and the kinetic curves of the reaction of DPPH with the thiols studied are used to determine the time necessary to decrease the concentration of DPPH by 50 and 100%. The most active compound tested was found to be 2-mercaptoethylene, the least active was mesodimercaptosuccinic acid. Figures 3; references 13: 9 Russian, 4 Western.

6508/12955

CSO: 1841/319

UDC 541.654:532.72

INFLUENCE OF MOLECULAR MOTION ON CELLULAR EFFECT IN THERMAL DECOMPOSITION OF AZOISOBUTYRIC ACID DINITRILE IN POLYPROPYLENE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 12, Dec 85  
(manuscript received 21 Feb 84) pp 2944-2951

[Article by A. P. Gryva, L. N. Denysova and Ye. T. Denysov, USSR Academy of Sciences, Department of Institute of Chemical Physics, Chernogolovka]

[Abstract] A study was made of the cellular effect upon thermal decomposition of azoisobutyric acid dinitrile (I) in isotactic polypropylene (II). The molecular mobility of the medium was varied by the addition of various quantities of chlorobenzene to the (II) matrix. Experiments were performed at various temperatures while the frequency of rotary diffusion of 2,2,6,6-tetramethyl-4-benzoyloxypiperidine-1-oxyl, a cyanoisopropyl radical acceptor, was measured. The frequencies of rotary and translational diffusion of the radicals were calculated and the data obtained used to analyze various kinetic systems of the cellular effect. The experimental data on decomposition of I in II containing various quantities of chlorobenzene were found to agree with the multistage cell pair model which considers both translational and rotational diffusion of the cyanoisopropyl radical, as well as the possibility that a molecule of nitrogen located between the radicals may hinder their recombination. Figures 5; references 17: 15 Russian, 2 Western.

6508/12955  
CSO: 1841/366

UDC 678.5:66.095.262:66.085.33.039.83

RADIATION EMULSION POLYMERIZATION OF HIGH DEGREE OF CONVERSION

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 86 p 59

[Article by L. A. Krylova, V. Lyubitskiy, V. V. Polikarpov and R. M. Pozdeyeva]

[Abstract] Differences observed in emulsion polymerization initiated with various initiators or with  $\gamma$ -radiation were explained in the following way. When reagents like potassium persulfate are used as initiators, the first radicals are formed in aqueous phase. When the monomer-polymer stage is reached, the diffusion of the initiating radicals from aqueous into polymer-monomer phase becomes difficult thus lowering the polymerization process. Upon  $\gamma$ -radiation, initiating radicals are formed both in aqueous and in the polymermonomer phase; the contribution from polymer radicals intensifies with reaction progress leading to 100% conversion of monomers at temperatures below the polymer glacing temperature. Figure 1; references 7: 2 Russian, 5 Western.

7813/12955

CSO: 1841/464

UDC 678.5.02.027.72

# AUTOMATION OF REACTOPLASTICS PRESSING PROCESS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 86 pp 49-57

[Article by V. P. Bernatonis and A. V. Sabalyauskas]

[Abstract] At present time at least 90% of reactoplastics (thermoreactive resins and compositions) are precessed by the pressing methods, most of them semi-automatically. A completely automated process was introduced at the Vilnius plastics plant. One worker can operate 22 presses in this system, the only limit to this being the constrain of the building itself. To obtain high quality product with minimal investment of time, material and energy, optimal pressing conditions must be determined. Considerable attention was devoted to temperature of preheating, to pressure temperature and time of the heating. The most effective method for automation of the reactoplastics process should consider the following minimal steps: programmed supply system-microprocessor-input-output system, technological operations/management condition sensors-microprocessor. References 4 Russian.

7813/12955

CSO: 1841/464

UDC 678.5.073:541.67

REGULATION OF RHEOLOGIC AND EXPLOITATIONAL PROPERTIES OF MAGNETOPLASTICS BY  
MODIFICATION OF POLYMER BINDERS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 86 pp 23-26

[Article by A. F. Bezgachev, A. G. Golubkov, V. K. Krivosheyev, E. N. Tkalenko  
and M. S. Trizno]

[Abstract] Polymer compositions with magnetic properties (MP) have become important materials in recent years. By proper modification of the polymer matrix, the rheological and technological properties of MP may be optimized. Optimal magnetic properties of MP are achieved with a 56-57% content of the filler. Addition of even 3% of plasticizers affects rheological properties of MP. The effectiveness of such modification depends on the ability of the plasticizer to react with polymer matrix and with the filler surface. Selection of the modifiers depends on the processing conditions and requirements placed on the end products. When the products are obtained by casting, plasticizers should be used preventing formation of aggregates; when an extrusion method is used, maximal magnetic energy is achieved using stearate and silicate plasticizers. Figures 3; references 7: 4 Russian, 3 Western.

7813/12955

CSO: 1841/464

UDC 678.5.003.13:658.516.1

SYSTEM OPTIMIZATION FOR TECHNICAL-ECONOMIC STANDARDIZATION IN PLASTICS  
PROCESSING SUBUNITS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 86 pp 3-4

[Article by S. I. Gromov and V. P. Zorin]

[Abstract] A unified computerized system of standards is being developed in the USSR for planning of social and economic developments. One of the first systems to be tried covered the technical-economic standards of labor, crude materials, energy and heating resources, utilization of industrial potential and capital investment. The "Soyuz Plastpererabotka" Association is involved in determining standards for its specialty in an overall effort headed by the Ministry of Chemical Industry. The leading organizations in this project are State Plastics Project, NPO [Scientific Production Association] "Plastik", VO "Soyuz Plastpererabotka", NPO "Polimerbyt", Central Scientific Research Laboratory of Polymer Materials and production association of Plastic Processing imeni "Komsomolskaya Pravda". Some of the fields covered in this effort include standards for effectiveness of productivity, financial-budgetary aspects, environmental protection. A specialized laboratory was organized for developmental work on standards. Existing standardization methods used now in various places are being tabulated. Great need was voiced for a wider use of computers in this effort and proper documentation of all recommendations.

7813/12955

CSO: 1841/464



ALL-UNION CONFERENCE ON HIGH MOLECULAR WEIGHT COMPOUNDS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 86 pp 61-62

[Article by A. L. Rusanov]

[Abstract] This, the 22nd, conference was held 15-19 Oct 85 in Alma-Ata with over 900 scientists in attendance. Four plenary and 38 sectional sessions were held along with 688 exhibits devoted to chemistry, physical chemistry, physics and processing technology of polymers. In the plenary sessions, Academician V. V. Kopshak discussed selected problems in polymer chemistry; Deputy Minister of USSR Ministry of Chemical Industry, Z. N. Polyakov, addressed novel developments in polymer chemistry and the roles of high molecular weight compounds. Director of the Administration of USSR Ministry of Petrochemical Industry, V. V. Rabotnov concentrated on production and application of elastomers; future studies of high molecular weight compounds in Kazakhstan were discussed by B. A. Zhubanov, the Director of Institute of Chemical Sciences, KazSSR Academy of Sciences. In sectional papers a wide variety of topics was covered: emulsion polymerization, radical polymerization of nitrogen and oxygen containing polyfunctional compounds ionic polymerization of heterocycles, polymerization and copolymerization of dienes. Considerable attention was devoted to polycondensation processes. A very current topic was chemical and physical structure of polymers. Polymer solutions, physics and chemistry of plastic flow, kinetics, catalysis and mechanism of urethane formation represented other assorted subjects covered at this conference.

7813/12955

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UDC 547.652.9:678.684

POLYCONDENSATION OF POLYCHLORONAPHTHALENES WITH SODIUM SULFIDE

Novosibirsk IZVESTIYA NOVOSIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian No 1, Jan 86 (manuscript received 7 Jan 85) pp 94-98

[Article by V. Z. Annenkova, L. M. Antonik, N. A. Gorban, V. V. Odintsov and M. G. Voronkov, Irkutsk Institute of Organic Chemistry, Siberian Department, USSR Academy of Sciences]

[Abstract] Studies were conducted on the polycondensation of a mixture of polychloronaphthalenes (largely hexa-, penta- and tetra-congeners) in N-methyl-2-pyrrolidone under various conditions in the presence of different concentrations of sodium sulfide. On the basis of physical and chemical analysis of the resultant polymeric products and their deformational thermal stability and  $T_p$  values (50-105°C) synthetic conditions were defined leading to products with commercially optimal properties. The key factors leading to high MW products and high deformational thermal stability were the temperature of the reaction -- 110°C -- and the duration of the reaction -- 8-10 h -- with polychloronaphthalene: $\text{Na}_2\text{S}$  ratio of 1:(2-2.25). The excess of sodium sulfide was necessary for insuring a high degree of conversion of the monomers, as well as for the prevention of carbon-carbon bond formation. Figures 2; references 11: 9 Russian, 2 Western.

12172/12955

CSO: 1841/478

UDC 66.093.8:[661.7:547.339.21]  
[661.7:547.398.13].002.237

DETERMINATION OF OPTIMAL PARAMETERS FOR SULFURIC ACID HYDROLYSIS OF ACRYLO-  
NITRILE TO ACRYLAMIDE

Moscow KHIMICHESKAYA PROMYSHLENNOST in Russian No 1, Jan 86 pp 15-16

[Article by S. L. Zakoyan, N. Sh. Mailyan, M. A. Dzhragatspanyan, V. K. Pyzhov,  
V. N. Zaplishnyy, G. M. Pogosyan and S. G. Matsoyan]

[Abstract] The goal of this study was to determine optimal technological parameters for sulfuric acid hydrolysis of acrylonitrile (AN) and to obtain an aqueous solution of acrylamide (AA) ready for direct utilization in further reactions. Analysis of experimental data showed that in order to obtain a 98% yield of AA, the hydrolysis should be carried out at 90°C for 3 hrs using 88% sulfuric acid. To obtain an effective heat removal, the reaction should be run in two steps: at 80°C AN is added and then the process is continued at 90°C for 3 hrs, maintaining sulfuric acid concentration at 85%. The starting temperature in the reactor is achieved by addition of calculated amounts of sulfuric acid to water. The yield of the aqueous solution of AA ready for further reaction is 95-98%. Figure 1; references 9 Russian (4 by Western authors).

7813/12955  
CSO: 1841/474

UDC 678.643'42'5:66.085.3

(METH)ACRYLIC GLYCIDYL ESTERS IN RADIATION-SOLIDIFIED OLIGOMER-MONOMER COMPOSITIONS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 10-11

[Article by V. S. Ivanov, V. K. Smirnova, I. V. Valisyeva, I. V. Tishina, B. G. Zadontsev and A. S. Burmenko]

[Abstract] The possibility of using low-molecular-weight  $\beta$ -hydroxyethylacrylate as a solvent for radiation-solidified compositions based on acrylated epoxydiane oligomer ED-20 was investigated. Radiation-initiated homopolymerization of all monomers occurs with a high yield, the products being insoluble in nonpolar organic solvents and swelling in polar solvents at 80°C. It was shown that low-molecular-weight substituted  $\beta$ -hydroxyethylacrylates are radiation-sensitive monomers which could be used as copolymerizing solvents with ED-20 in radiation solidified compositions. They are as good as vinyl monomers and epoxy compositions in respect to their dielectric properties, comparing well with methylmethacrylate, butylmethacrylate, styrene, TGM-3 etc. Figure 1; references 6 Russian.

7813/12955

CSO: 1841/465

UDC 678.539.3:541.64:678.029

PHYSICAL-CHEMICAL PROPERTIES AND CHEMICAL STABILITY OF COMPOSITION MATERIALS  
BASED ON LPPE IN AGGRESSIVE LIQUID MEDIA

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 21-22

[Article by I. I. Fatoyev, A. P. Kondratov, V. G. Nazarov, B. M. Tsogoyev,  
A. N. Gromov and V. N. Manin]

[Abstract] Polymer compositions with organic and inorganic fillers are being used routinely. However, data are meager on their performance in aggressive media. Chemical stability and physical-mechanical properties of compositions based on low-pressure polyethylene (LPPE) were investigated. All of the materials studied were found to swell in the solvents. In concentrated HCl, a reaction takes place with fillers which are soluble in acid. The wash-out leads to formation of pores throughout the sample. Yet, the strength of such materials does not seem to be affected, regardless of whether an inorganic or organic acid is used. References 6 Russian (1 by Western authors).

7813/12955

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UDC 678.5.543.874

CLASSIFICATION OF POLYMER MATERIALS ACCORDING TO CRITERIA OF TOXICOLOGICAL  
EVALUATION OF THEIR COMBUSTION PRODUCTS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 26-28

[Article by V. S. Ilichkin]

[Abstract] Toxicological evaluation of combustion products of various polymers is necessary for safety of residents of burning homes, transportation equipment etc. A formula was developed for determination of the coefficient of toxicity of burning materials  $KT = K_i m_i / R_i$  where  $m_i$  = number of fatalities within first 6-30 min of exposure;  $K_i$  = relative coefficient corresponding to  $KT$ : 0 if no deaths were observed in 30 min and 100 if all animals died within 6 minutes. Other classification methods are based on combustion of Douglas pine as the standard or the quantity of material in one cubic meter which caused 50% death of the test animals. The author proposed a method based on the principle: content of  $CO_2$ --toxic effect. Four classes of toxicity are identified in this system based on the quantity of  $CO_2$  in one cubic meter of air obtained from combustion of 10 g of the substance being tested: minimal toxicity: less than 40 mg/g; moderate: 40-120 mg/g; dangerous: 120-360 mg/g and extremely dangerous over 360 mg/g. This method should be used in development of unified classification system of the toxicity of burning plastics. References 12: 7 Russian, 5 Western.

7813/12955

CSO: 1841/465



UDC 678.643'42'5:678.746:22-5.404.9:661.185.1

INTENSIFYING ACTION OF SURFACTANTS DURING ALLOYING OF ADHESIVE MATERIALS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 38-40

[Article by T. Ya. Koltsova, V. A. Volkov, Yu. S. Kochergin and T. K. Khafizova]

[Abstract] Adhesive materials comprise about 15% of the total production of plastics. In spite of their universal application, each case requires special "tailor made" properties. A method exists for effective modification of polymers with additives which do not interact with matrices of other polymers. A method was described based on a combination of alloying additives with surfactants in modification of various adhesive materials. The work was done with a thermoplastic adhesive "PS" and epoxy polymers ED-22 and UP-5-233. The modifying agents were: polymethylsiloxane rubber, oligohydroxypropylene glycol, divinyl- and isoprene-styrene rubber. Monoalkyl ester of polyethyleneglycol and fatty acids was used as a surfactant. It was established that separation of polymer mixture into low and high molecular phases retained high strength of the adhesive and made it possible to regulate its relaxation properties. Only a predetermined volume of inclusions along with homogeneous distribution of the particles assured increased adhesive strength. While separate introduction of these modifiers increased frost resistance and tearing strength by 7-25%, concurrent application increased it by 250-300%. Improvement in physicomechanical properties occurred with 5% or less of the additives. Figure 1; references 5 (Russian).

7813/12955  
CSO: 1841/465

EFFECTIVENESS OF POLYMER MATERIALS USED FOR DRIP IRRIGATION SYSTEMS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 pp 59-60

[Article by O. Ye. Yasonidi and N. G. Stepanova]

[Abstract] Drip irrigation system leads to increased harvests with lower consumption of water, fertilizer and electric power. Most of the equipment is made of plastics and it requires special purification steps for the water which usually is based on filtration. The principal element of this system, however, is the drip-cock which determines hydraulic and technological parameters of these systems. Several types are already in use supplying 2 to 12 liters of water per hour. One such drip-cock, KSS-2, satisfying all the requirements, was described in detail. It is produced by Novocherkassk Engineering-Reclamation Institute. It was tested with good results in apple, nut orchards and in grape vineyards. It was especially effective in green house applications. The yield increased by 96.8% with water decrease of about 35%. Figure 1.

7813/12955  
CSO: 1841/465

UDC 678.664-405.8:681.62.067.72

EQUIPMENT FROM MICROPOROUS FOAM POLYURETHANE FOR USE IN POLYGRAPHIC INDUSTRY

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 86 p 61

[Article by V. M. Shimanskiy, D. A. Teodorovich, M. L. Brodskiy and L. P. Golushkova]

[Abstract] Introduction of microporous foam polyurethane (FPU) to polygraphic equipment expanded its use widely because of addition to the traditional rollers used in the machine, cover pads now can be made which require no springs for proper attachment. This simplifies the procedure, is less expensive and less complicated. Technology of the production of such pads is very simple and it is already in use on at least 20 polygraphic stations. These new FPU pads surpass the performance of the old plastic materials. The life expectancy of FPU pads is 2-3 years, about 50-100-fold longer than the old plastic ones.

7813/12955  
CSO: 1841/465

UDC 678.742.32:62--405.8

THERMALLY STABLE GAS-FILLED PLASTICS BASED ON ACRYLONITRILE-ACRYLIC ACID  
COPOLYMER

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA  
TEKHOLOGIYA in Russian Vol 28, No 9, Sep 85 (manuscript received 19 Dec 83)  
pp 78-81

[Article by A. D. Mitrofanov, V. M. Mamontov, P. A. Okunev, O. G. Tarakanov,  
Vladimir Polytechnical Institute]

[Abstract] Results are presented from a study of the influence of fiber fillers on the number of open cells in foam polyacrylonitrile. The properties of heat-treated filled foam plastics are described. Fillers used included glass, silicon and carbon fibers, 5-10 micrometers in diameter and 60 to 200 micrometers long. Increasing the content of fiber in the plastic foam caused an increase in the number of open cells. Introduction of 20% carbon fiber increased the content of open cells from 8 to 50%, glass fiber--to 42%, and silicon fiber--to 33%. Figures 2; references 3 (Russian).

6508/12955  
CSO: 1841/332

UDC 543.53+541.15

NEUTRON-ACTIVATION ANALYSIS USING THERMOCHROMATOGRAPHY. III. ANALYSIS OF  
OBJECTS OF BIOLOGICAL ORIGIN

Leningrad RADIOKHIMIYA in Russian Vol 27, No 6, Nov-Dec 85 (manuscript  
received 11 Mar 83; in final form, 16 Jul 85) pp 791-796

[Article by G. Sattarov, A. A. Kist, A. V. Davydov and Sh. Khatamov]

[Abstract] A study was made of the possibility of thermochromatographic isolation of volatile elements in a column filled with an adsorbent with a temperature gradient. Biological specimens were bombarded with neutrons with a flux of  $5 \cdot 10^8$  n/cm<sup>2</sup> sec for 30 minutes to 10 hours, then cooled for three to twenty days and separated on the column. A number of volatile elements, it was found, can even be separated in a current of air. The use of chlorine as the carrier gas significantly increases the yield of elements and speeds up separation. The limits of detection of most elements in biological specimens are lower when thermochromatographic separation is used than in instrumental analysis, and reproducibility and correctness are satisfactory. Thermochromatographic separation can be implemented in various temperature gradients with various sets of elements in each group. Either the separation of individual elements or isolation of rather large groups and the separation of such elements as sodium and bromine is possible. By varying the carrier gas and reagent gas, plus other conditions, it becomes possible to determine forms of fixation of elements in the objects studied. Figures 2; references 11: 8 Russian, 3 Western.

6508/12955  
CSO: 1841/386

UDC 628.388.666.1:543.42

STUDY OF STRUCTURAL CONVERSIONS IN SURFACE LAYER OF PHOSPHATE GLASSES  
CONTAINING RADIOACTIVE WASTES

Leningrad RADIOKHIMIYA in Russian Vol 27, No 6, Nov-Dec 85 (manuscript  
received 9 Jul 84; in final form, 4 Jul 85) pp 822-826

[Article by A. S. Aloy, T. I. Kolycheva, A. V. Trofimenko and Ye. A.  
Shashukov]

[Abstract] The purpose of this work was to determine the possibility of detecting, by infrared reflection spectroscopy, the initial stages of structural changes on the surfaces of phosphate glasses containing vitrified radioactive wastes. The phase composition of the crystalline compounds formed in the surface layer of the glass was determined by x-ray diffractometry. The phase changes occurring in the phosphate glass specimens under the influence of heat were found to result in deterioration of chemical properties. The IR spectra showed that the appearance of structural conversions in the surface layers of the glasses leads to a change in the ratio of intensities of reflection bands at  $1060$  and  $1140\text{ cm}^{-1}$ . Figures 3; references 8: 6 Russian, 2 Western.

6508/12955  
CSO: 1841/386



UDC 541.127+678.744.422

INFLUENCE OF NITROXYL STABLE RADICALS ON PHOTO- AND LASER-INDUCED DECOMPOSITION OF AZOISOBUTYRIC ACID IN SOLUTION

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 38, No 10, Sep-Oct 85  
(manuscript received 15 Nov 84) pp 619-623

[Article by R. O. Chaltikyan, G. E. Safaryan, N. M. Beyleryan and L. Ye. Terminassyan, Yerevan State University]

[Abstract] A study was made of the catalytic effect of free stable radicals on photo- and laser-induced decomposition of azoisobutyric acid dinitrile in chlorobenzene. The kinetics of decomposition were studied by a manometric method. The source of light was a mercury lamp and filter yielding a band 400 Å wide with  $\lambda_{\text{max}} = 365$  nm. The source of laser radiation was a nitrogen laser with a wavelength of 338 nm and a band width of 1 Å. It was found that nitroxyl radicals lead to acceleration of the decomposition of the dinitrile by trans-c isomerization; the use of these radicals to determine rates of initiation upon photo- and laser-induced processes is not desirable. Figures 3; references 10: 6 Russian, 4 Western.

6508/12955

CSO: 1841/360

UDC 678.023.3;678.742.2;678.762.2;678.046.9;678.741.3

EFFECT OF LIQUID RUBBERS ON TECHNOLOGICAL PROPERTIES OF SKEPT RUBBER MIXTURES

Moscow KAUCHUK I REZINA in Russian No 10, Oct 85 pp 8-11

[Article by V. P. Sycheva, A. A. Kanauzova and V. F. Tamarkin]

[Abstract] The effect of adding oligoisoprene dihydrazide (molecular weight 5000), carboxylated oligobutadiene (molecular weight 3000), urethane acetyl rubber (molecular weight 50,000) or butadiene rubber (molecular weight 3000) to a standard SKEPT-40 [SYNTHETIC ETHYLENE PROPYLENE] rubber mixture was studied. The oligodienes decreased torque, improved workability and lowered the preparation temperature of the rubber mixture. Extrusion productivity increased, residue decreased and both adhesive properties and appearance were improved. Introducing up to 2.5 weight percent oligodiene with a hydrazide or carboxyl terminal group somewhat increased viscosity, while further additions decreased it. The concentration of carbon-rubber gel, bound rubber and cohesion stability increased. The mechanism of these effects is similar to that of antiplasticization, involving increased mobility and structural rearrangement of elastomer macromolecules. The effectiveness of the oligomers increased with increasing dispersion and was optimal when oligomer was added to the premix carbon with a 1:1 ratio at 100°C. The data indicate that use of oligodienes as temporal plasticizers is an effective method for improving the properties of ethylene propylene rubbers. Figures 3; references 8 (Russian).

12126/12955  
CSO: 1841/232

UDC 678.4.01;539.61:046

EFFECT OF FILLERS IN POLYTRICHLOROBUTADIENE ADHESIVES ON FORMATION OF ADHESIVE RUBBER-METAL COMPOUNDS DURING VULCANIZATION

Moscow KAUCHUK I REZINA in Russian No 10, Oct 85 pp 11-14

[Article by S. V. Belikova, G. S. Polsman, D. P. Trofinovich and A. A. Dontsov]

[Abstract] A study was conducted of the effect of fillers and promoters in poly-1,1,2-trichlorobutadi-1,3-ene adhesives on the formation of rubber-metal bonds during vulcanization. Technical carbons of the K354, P234, P514 and P803 grades, which differ in dispersivity and surface activity, were used as fillers, while p-dinitrobenzene was used as promotor. SKI-3 rubber was used as the substrate. The stability of the metal-rubber bond was found to increase with increasing dispersivity of the filler and to be optimal at varying levels for each filler. This indicates active participation of filler in bond formation. The use of filler also increased the deleterious effect of elevated temperature on bond stability. Use of promotor increased bond stability at elevated temperatures. The effects observed are the result of the adsorption of adhesive and substrate polymers on the surface of the filler, as well as its activation by chemical interactions. Use of ammonia to modify the polytrichlorobutadiene lowered the activation energy of hydrogen chloride cleavage. In the presence of filler this activation energy was decreased with increasing carbon activity. Fillers had little effect on the rate of covulcanization, which was low. Use of promotor increased covulcanization. The data indicate that the fillers increased the reactivity of the adsorbed polytrichlorobutadiene due to the active chemical interaction of the polymers with the surface of the carbon. Figures 3; references 10 (Russian).

12126/12955

CSO: 1841/232

UDC 678.065:629.114.6:003

ECONOMIC EFFECTIVENESS OF PRODUCTION AND USE OF PASSENGER CAR TIRES WITH  
DECREASED ROLLING LOSS

Moscow KAUCHUK I REZINA in Russian No 10, Oct 85 pp 34-36

[Article by A. M. Pichugin, S. N. Ragimov and A. G. Shvarts]

[Abstract] The effect of various protective rubbers on the wear of experimental tires was studied. Three protective rubbers were used: rubber A contained resin SKMS-30ARKM-15, rubber B contained SKI-3-01 and rubber C contained SKI-3-01 and SKD. In addition, rubber B contained the least technical carbon and rubber A the most. Due to their decreased densities, less electrical energy is expended in mixing rubbers B and C than rubber A. Tires protected with rubber B exhibited the best automobile fuel economy, while those with rubber A were the most resistant to wear. Complex calculations demonstrated that the use of rubber B gave the greatest economic effect, while rubber C gave the least. Use of rubber B would increase the wholesale price of a tire from 30.00 to 30.60 rubles and the retail price from 72.00 to 73.00 rubles. The data indicate that improving the fuel-economy characteristics of tires is a more effective economical measure than decreasing tire wear. Figures 1; references 7 (Russian).

12126/12955  
CSO: 1841/232

STABILITY OF POLYURETHANE LAYER BOND TO RUBBER

Moscow KAUCHUK I REZINA in Russian No 10, Oct 85 pp 37-38

[Article by Yu. N. Lyusov, L. S. Krokhina, L. R. Lyusova and V. N. Kuleznev]

[Abstract] The thermodynamic interaction of polyurethane with rubber in solution was correlated with the adhesion of polyurethane coverings to solid rubber. The Scott interaction parameter and minimum stratification concentration were determined in chloroform or ethyl acetate. The ratio of these two parameters was plotted against adhesion stability determined in the presence or absence of an NCO-group-containing reinforcer. The order of rubber adhesion to SKU-8TB or UK-1 polyurethane was NK, SKI-3, SKS-30RP, SKN-40, SKN-26 and SKN-18, from lowest to highest. Reinforcer increased adhesion without changing stability order. The low adhesion stability of polyurethane with nonpolar polymers is determined by their low compatibility. A good correlation between the thermodynamic ratio and adhesive properties was found, with adhesion stability decreasing with increasing repulsive forces in the contact zone. Adhesion was greatest with SKN-26 rubber, which has a solubility parameter closest to that of polyurethane. Figures 2; references 6 (Russian).

12126/12955

CSO: 1841/232

UDC 661.716.2.315.2

PRODUCTION OF SYNTHETIC FILM-FORMER FROM BUTADIENE AND RECOVERED STYRENE

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 3, May-Jun 85  
pp 65-67

[Article by S. M. Aliyev, T. A. Gadzhiev, R. D. Ismailov, A. Kh. Kuliev,  
F. M. Musayeva and F. Yu. Yusif-Zade, Institute of Petrochemical Processes  
imeni Yu. G. Mamalidayev, AzSSR, Academy of Sciences]

[Abstract] The purpose of this study was to produce a synthetic film former using recovered styrene, a side product from the process of manufacture of divinyl styrene rubber, as one of the raw materials. Recovered styrene is produced in the stage of distillation of unreacted hydrocarbons from latex. The experiments were performed in 200 cm<sup>3</sup> stainless steel ampules in a thermostated silicone oil bath. The recovered styrene had the following composition in mass percent: styrene, 85.0, ethylbenzene, 13.8, o-xylene, 0.05, isopropylbenzene, 0.15, low-molecular-weight styrene compounds, 1.0. The solvent used was p-xylene or a mixture of the solvent and white alcohol 1:1. Experiments on free radical copolymerization of styrene and recovered styrene with butadiene were performed at 160°C, 24 hours. The synthetic film formers produced were tested to determine the conversion of monomers, content of free styrene and physical-mechanical properties of the coatings produced. The possibility was demonstrated of using styrene production wastes for the production of synthetic butadiene-styrene film former with the necessary characteristics for practical use. References 5 (Russian).

6508/12955  
CSO: 1841/365



UDC 678.028.678.7:546.221

VULCANIZATION OF COMPOSITIONS BASED ON DIVINYL-STYRYL AND EPICHLOROHYDRINYL ELASTOMERS WITH BARIUM SULFIDE

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 1, Jan-Feb 86  
(manuscript received 15 Dec 84) pp 34-38

[Article by A. A. Nosnikov and G. A. Blokh, Dnepropetrovsk Chemical-Technological Institute]

[Abstract] An attempt was made to improve the properties of rubber mixtures based on DSSK-18 and epichlorohydrin elastomers (CHE): their strength, elasticity, thermal and chemical stability with retention of resistance to frost. Partial covulcanization of polymer chains of CHE with DSSK-18 was shown to lead to cross-linking and improved thermal and chemical stability. The vulcanizates obtained exhibited a number of improved physicochemical properties, resistance to tearing, to frost and stability during storage at elevated temperatures. The vulcanization process could be intensified by increasing the temperature to 446 K while decreasing the vulcanization time by a factor of four; the original properties of the rubber were not affected by this modification. Figures 2; references 8: 6 Russian (1 by Western author), 2 Western.

7813/12955  
CSO: 1841/456

DEVELOPMENT DURING 1984 OF METHODS OF WATER ANALYSIS

Moscow KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 7, No 6, Nov-Dec 85  
(manuscript received 5 Jun 85) pp 31-52

[Article by A. B. Terletskaya, Institute of Colloid, Chemistry and Water Chemistry imeni A. V. Dumanskiy, UkSSR Academy of Sciences, Kiev]

[Abstract] This is a broad overview of articles published in 1984 on the analysis of natural and waste water. It characterizes several other published overviews. Articles on the analysis of metals show that results can vary due to metal complexes; the use of inverse volt-amperometry can be useful because it does not disturb the equilibria of complex formation. Other articles on metal analysis include the analysis of aluminum, with its form varying with pH. Methods of determining inorganic components are addressed under several main headings: multielement analysis (including methods of concentrating samples and the use of ion-exchange resins and multistage extraction); multicomponent analysis of anions (the use of ion chromatography); K, Ca, Mg, Ba, Be (including determination of K in the presence of other elements and determination of Be(II) at levels as low as 0.2 ng/ml); Al, Ga, In, Fe, Cr, Mn (including direct determination of Al in seawater, of In and Ga in natural waters, of Fe(II) in the presence of Fe(III), and of Fe(III) in the presence of other metals); Cu, Co, Ni, Zn, Cd, Pb (including concentration and determination of Cu in natural waters, of Co in seawater, of Zn in cooling systems, and low levels of Cd and Pb); Hg, Ag (including automated methods of Hg determination and direct determination of Ag in natural waters to sensitivities of 0.02 g/l, with repeated treatment of samples lowering this to 5 ng/l); As, Sb, Sn (including determination of As in the presence of interfering substrates and the use of hydrides for automatic determination of As and Se and ways of improving hydride collection and of using selective chelating sorbents); Se, Te, Ge (including determination of Se in the presence of As and in seawater, and flotation extraction of Te providing sensitivities as low as 0.05 ng/l); Mo, V, U (including coprecipitation of Mo with Mn, resin extractions, and determination of U(VI) with a sensitivity of 20 ng/l); halogen and cyanide ions; nitrogen and phosphorous ions (including automatic, continuous determination of nitrate by ultraviolet adsorption and determination of low levels of phosphate in potable water and in sea water); and sulfur-containing ions, oxygen, ozone, and peroxide (including automatic

chemiluminescent determination of  $\text{SO}_2$  in rainwater). Determinations of organic compounds address questions of concentration, volatile compounds, phenols, polyaromatic hydrocarbons, pesticides, surface-active substances, petrochemicals and other organic compounds. References 291: 4 Czech, 1 Hungarian, 84 Russian, 202 Western (some by Soviet authors).

12762/12955

CSO: 1841/404

UDC 628.31:725.4

IMPROVEMENT IN REMOVAL OF CONTAMINANTS FROM COAL MINING EFFLUENT WATERS

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 2, Feb 86 pp 24-26

[Article by R. D. Gayduk, A. T. Medved and V. I. Shatilova]

[Abstract] Effluents from the Vorkuta mines are contaminated with finely dispersed suspension of coal and mineral particles which are very difficult to precipitate; the concentration of impurities ranges from 0.04 to 120 g/l. Mechanical precipitation cannot be used in purifying these waters because of the climatic conditions. It was shown that such effluents may be effectively purified by substituting cationic polyelectrolyte VPK-402 for aluminum sulfate and various surfactants. The effectiveness of this approach was tested in four mines: Vorkutinskaya, Severnaya, Yun-Yaga and Zapadnaya. Under optimal conditions VPK-402 flocculated the suspensions without pre-treatment of the effluent with mineral coagulants. Utilization of VPK-402 for this purpose should lead to savings of 200-300,000 rubles per mine due to decreased requirements for sediment storage, facilities for reagents and simplified technology. Figures 2; references 2 (Russian).

7813/12955  
CSO: 1841/467

UDC 628.162.1:69(211)

UNDERGROUND WATER PURIFICATION STATION IN TYUMEN OBLAST

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 2, Feb 86 pp 11-12

[Article by N. D. Artemenok, Scientific Research Institute of Liquid Technology]

[Abstract] Three methods have been recommended for purification of underground waters in Tyumen Oblast, depending on the content of various impurities. The first method was designed for the following maximum levels of impurities: total iron 8 mg/l, iron and calcium phosphates 40 mg/l,  $\text{CO}_2$  100 mg/l,  $\text{H}_2\text{S}$  2 mg/l, pH above 6.8, Mn 2 mg/l; phenols and petroleum products should be absent. This purification method included aeration, filtration, disinfection and storage. The next method, designed for the above content of impurities and up to 0.025 mg/l of phenols and 0.1 mg/l petroleum chemicals, was analogous to the first method with addition of an adsorption-filtration step. The third method was to be used with most contaminated water and it included aeration-degassing, sedimentation, filtration and adsorptive filtration. Prior to storage, the water was disinfected as in the previous methods. Currently methods are being developed for removal of methane dissolved in water. References 4 (Russian).

7813/12955

CSO: 1841/467

ACHIEVEMENTS IN WATER TREATMENT AS WORTHY PREPARATION FOR XXVII CONGRESS OF CPSU

Moscow KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 7, No 6, Nov-Dec 85 pp 3-4

[Article, unsigned]

[Abstract] The key to scientific progress is increasing productivity based first of all on the growth of fundamental research and its rapid application to production. In the last ten years, industrial recycling and reuse of water has resulted in a yearly saving of 240 km<sup>3</sup>/yr of fresh water. The USSR has a leading world position in water technology, particularly in the classification of colloidal pollutants, in theories of electrochemical macrokinetics of dispersed systems and of microflotation and coagulation, in liquid-phase catalytic and photo-catalytic destructive oxygenation of organic pollutants, in the kinetics of destructive oxidation of biologically active substances at low concentrations, in the removal of pesticide residues, in the theory of adsorption of organic substances and its application to water purification, in the design of ion-exchange closed-loop industrial water supplies, in the use of immobilized microorganisms for destruction of synthetic organic compounds in sewage, in the processing of waste products from water purification, and in the crystallization of lightly bound substances based on aluminum-containing sulfate wastes. Significant advances have been made in the treatment of brackish water. There are still important shortcomings in the application of membrane technology and automatic control systems. Key areas needing effort include reverse osmosis and electro-membrane methods, new approaches to microbiological purification based on immobilized microorganisms, the reduction of energy requirements by catalysis, the development of new coagulants, automatic control methods for water purification, methods of determining pollutant levels in water, oxidative technology for the destruction of complex mixtures of natural and synthetic pollutants, improving the efficiency and energy use of adsorptive methods of purification, and developing electroseparation technology. Overall, these actions will reduce water pollution, insure environmental protection and eliminate fresh water shortages in many areas of the country.

12762,12955

CSO: 1841/404



## SCIENTIFIC RESEARCH WORK ON PURIFICATION OF NATURAL AND EFFLUENT WATERS

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 1, Jan 86 pp 2-4

[Article by S. V. Yakovlev, corresponding member, USSR Academy of Sciences; All-Union Scientific Research Institute of Water Supply, Sewage Systems, Hydrotechnical Equipment and Applied Hydrogeology]

[Abstract] Industrial water recirculation reduces the yearly requirement by over 220 km<sup>3</sup>, with about 70% of industrial requirements met by recirculated and reused water. Economic intensification called for by the April 1986 plenum of the CPSU Central Committee requires increased productivity of water systems and equipment and the creation of systems of water management whose elements can be stacked, rather than requiring more land. A wider use of centrifugal machines is envisioned, along with the use of such nontraditional filter media as pulverized anthracite or even polyurethane foams. Improvements in coagulation processes are necessary; anionic flocculents such as polyacrylamides and the cationic flocculent VPK-402 can aid these processes. Desalination processes are important for regions with resources of brackish waters and for industrial processes which result in a gradually increasing salinization of circulating waters; electrodialysis and reverse osmosis equipment is addressing these problems, with one pilot plant processing 11,000 m<sup>3</sup>/day of water and with a series of reverse osmosis apparatuses capable of processing up to 100 m<sup>3</sup>/day. Some of these purification methods may eventually be replaced by more energy efficient adsorptive purification approaches, especially ones which allow chemical rather than thermal regeneration of adsorbents. Electrochemical methods are also attractive in some applications despite their high energy requirements. Oxidative methods are widely used, but require effective catalysts for efficient operation. Biological methods can remove biodegradable organic compounds and are widely used to remove hydrogen sulfide from natural waters, as well as to process over 25 km<sup>3</sup>/year of sewage with a resulting removal of 7 million tons of organic substances. An emphasis on improving the speed and productivity of these processes can require increasing the level of dissolved oxygen or the charge of active sludge -- the "Oksitenk [Oxytank]" system increases productivity 2.5-5 times and lowers energy usage by 20%. Immobilized microflora on such substrates as sand, pulverized ceramics, activated charcoal or certain plastics and also be very effective, as can multistage processing, with bioorganisms tailored to the contaminants present at each individual stage. Bioorganisms can also be selected to directly process specific organic

wastes, as from alcohol production, and oxygen-containing mineral radicals, such as nitrates and chromates. Algo-bacterial combinations have proved useful in treating animal husbandry waste waters among others. While the volume of active sludge produced can be a problem, its protein content (up to 60%) gives it a potential use as a feed. Iron salts can be used to remove phosphates and reduce eutrophication of water sources. Denitrification is more difficult, but immobilized bacteria can be effective.

12762/12955

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UDC 628.3:543.33

DETERMINING PARAMETERS OF MAGNETIC PURIFICATION OF WATER BY WETTING ANGLE

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 1, Jan 86 p 18

[Article by R. P. Zadneprovskiy, engineer, Volgograd Engineering-Construction Institute]

[Abstract] Magnetic methods are used in industrial recirculation systems to improve water purity and clarity and to reduce scale formation in boilers. Changing ion concentrations require adjustments of magnetic field strength and water flow rates to maintain optimum operation. This paper describes a simple apparatus for gaging changes in ion concentrations by measuring the corresponding changes in the wetting angle. Water samples are withdrawn by a pipet and five individual drops are placed on a chrome-plated horizontal disk. The wetting angle for each of these drops is measured by viewing it through a loupe mounted on a swivel arm and fitted with a reticle. Rotating the loupe allows the viewer to set the reticle lines parallel to the side of the drop, providing a measurement within one angular degree with an indicator arrow on the fixed holder. Measurements for the five drops are averaged, a process which takes about two minutes. In a series of measurements, the optimum magnetization regime corresponds to the greatest change in the wetting angle. Typically, this can be determined within 30 minutes, providing a reliable and relatively rapid and simple method of setting optimum parameters. Figures 1; references 2 (Russian).

12762/12955

CSO: 1841/396

UDC 541.138.3:546

DIRECT AND INDIRECT PHOTOELECTRICAL OXIDATION OF UREA AND OXIDANT SYNTHESIS  
ON  $n\text{-TiO}_2$  ELECTRODE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 1 Jan 86  
(manuscript received 26 Dec 84) pp 140-141

[Article by V. A. Grinberg, Yu. B. Vasilyev, Z. A. Rotenberg, V. Ye. Kazarinov, V. A. Gromyko and V. B. Gaydadyov, Electrochemical Institute imeni A. N. Frumkin, USSR Academy of Sciences, Moscow; Institute of Medico-Biological Problems, USSR Ministry of Health, Moscow]

[Abstract] Recently, problems of purifying sewage and domestic water supplies have been complicated by high costs, largely for electrical energy in electrochemical processes. The present article reports on closed systems for direct electrooxidation of urea in  $\text{H}_2\text{SO}_4$  containing no chloride ions, electrooxidation of chloride ions in a neutral aqueous solution to synthesize a sodium hypochlorite oxidizing agent, and combined photoelectrooxidation of urea and chloride ions in a neutral aqueous solution. It was determined that in photoelectrolysis the parallel reaction  $2\text{OH}^- + 2h\nu \rightarrow \frac{1}{2}\text{O}_2 + \text{H}_2\text{O}$  occurs, oxidizing urea and chloride ions and forming corresponding harmless products. With  $n\text{-TiO}_2$  in 0.5 M  $\text{H}_2\text{SO}_4$ , nitrogen and carbon dioxide were identified in the gaseous phase, indicating a similar reaction in this "light" phase as that found in "dark" electrolysis on a platinum electrode with potentials above that for emitting oxygen. This approach can be used efficiently for cleaning sewage with good yields of sodium hypochlorite, which is used to remove organic impurities. Electrical energy use is reduced by 50-70%.  
References 11: 8 Russian, 3 Western.

12131/12955  
CSO: 1841/427

MISCELLANEOUS

ALL-UNION SCIENTIFIC SYMPOSIUM ON ACOUSTICAL CAVITATION AND USE OF ULTRASOUND  
IN CHEMICAL TECHNOLOGY

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 12, Dec 85 pp 3113-3115

[Article by Ye. N. Mokryy]

[Abstract] The title Symposium was held 25 February through 1 March 1985 in Slavskoye, Lvov Oblast. It was the first All-Union Symposium on cavitation and problems of the use of ultrasound in chemical technology and involved the participation of 140 persons from educational and research institutions across the nation. Results of experimental and theoretical studies were analyzed. Topics discussed included types of sonic-chemical reactions in nonaqueous systems, the mechanism of action of rotary hydroacoustic radiators, studies of the solubility of gasses in organic liquids in an ultrasonic field, the study of the combined influence of directed heat transmission and diffusion on the dynamics of vapor-gas bubbles in a sonic field, the effects of ultrasound directly on chemical, physical-chemical and catalytic processes, synthesis of oxides of nitrogen by exposure to low frequency acoustic oscillations at 7 to 200 hertz in water, investigation of the effects of ultrasound in polymers, and dosimetry of acoustic cavitation.

6508/12955  
CSO: 1841/366



## ORGANIC SUBSTANCES IN ATMOSPHERIC EFFLUENTS OF POWER FACILITIES OPERATING ON OIL SHALES

Moscow TEPLOENERGETIKA in Russian No 14, Jan 85 pp 58-59

[Article by S. N. Etlin, candidate of technical sciences, A. V. Povarov, engineer, M. T. Dmitriyev, doctor of chemical sciences, Ye. G. Rastyannikov and A. Kh. Koni, engineer]

[Abstract] Approximately 2000 t/yr of organic substances are released to the atmosphere, mostly in Estonia, from power stations burning oil shale. Burning one ton of oil shale releases only 0.034 g of benz(a)pyrene, providing little atmospheric contamination (3.5 km from the Estonian Regional State Power Station, the surface concentration was only  $0.0009 \mu\text{g}/100 \text{ m}^3$ , about 100 times less than the maximum allowable concentration). However, overall health evaluations are complicated by widely different allowable concentrations for various compounds. Samples were collected from effluent gases in an 8 X 200 mm sampling tube of molybdenum glass filled with poly-2,6-diphenyl-paraphenylene oxide. A total of 83 organic substances were identified in undispersed effluent gases, giving a total outflow of 0.06 kg/t of burned oil shale. This may be slightly lower than the expected 0.08 kg/t because of adsorption of some organics on ash particles. A table of 58 of these substances shows that 25 of them are derivatives of octane, heptane, hexane and pentane. Maximum allowable concentrations have been established for 22 of the compounds, which had a total concentration of  $3.24 \text{ mg}/\text{m}^3$ . For each of them, an individual pollution index was calculated as a ratio between maximum observed and maximum allowable concentrations. Highest index values were for styrene (25.0); isopropylbenzene (3.6); butyl acetate (2.0); m-,p-xylenes (1.2); and benzene (1.15). Concentrations of all other listed compounds were below maximum allowable concentrations. The total of pollution indexes was 63.65; for the listed compounds, this would give an averaged maximum allowable concentration of  $0.05 \text{ mg}/\text{m}^3$ . Calculations indicated that concentrations in the surface layer were less than a thousandth of maximum allowable levels. References 7 (Russian).

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CSO: 1841/400

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